# Broughton Primary School: Science Progression of Knowledge and Skills

**Sc1: Working scientifically** **Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:**

| Skills | KS1 | Lower KS2 | Upper KS2 |
|---|---|---|---|
| Questioning | asking simple questions and recognising that they can be answered in different ways<br>Cycle A Spring term<br>Cycle A Summer 2 | asking relevant questions and using different types of scientific enquiries to answer them<br>Cycle A Spring 1<br>Cycle B Aut 1<br>Cycle B Aut 2<br>Cycle B Spring 1 | |
| Planning and conducting investigations | Performing simple tests<br>Cycle A Aut 1<br>Cycle A Sum 1<br>Cycle B Autumn<br>Cycle B Spring | Setting up simple practical enquiries, comparative and fair tests<br>Cycle A and B Aut 2<br>Cycle A and B Spring 1<br>Cycle A and B Spring 2<br>Cycle A and B Summer | Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>Cycle A Spring 1<br>Cycle A Spring 2<br>Cycle B Aut 1<br>Cycle B Spring<br>Cycle B Summer |
| Observations | observing closely, using simple equipment<br>All except Cycle A Aut 1 and Sum 1 | making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br>Cycle A and B Aut 1<br>Cycle A and B Aut 2<br>Cycle A Spring 1<br>Cycle A Summer | taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>Cycle A Spring 1<br>Cycle A Spring 2<br>Cycle A Summer<br>Cycle B Aut 1<br>Cycle B Aut 2<br>Cycle B Spring<br>Cycle B Summer |

| **Sc1: Working scientifically** **Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:** | | | |
|---|---|---|---|
| Collecting data | gathering and recording data to help in answering questions<br><br>All except Cycle B Autumn term | • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>Cycle A and B Aut 1<br>Cycle A and B Aut 2<br>Cycle A Spring 1<br>Cycle B Spring 2<br>Cycle A Summer<br>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables<br>Cycle B Aut 1<br>Cycle A and B Aut 2<br>Cycle A and B Spring 1<br>Cycle A and B Spring 2<br>Cycle A Summer | • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs<br>Cycle A Spring 1<br>Cycle A Spring 2<br>Cycle A Summer<br>Cycle B Aut 1<br>Cycle B Spring |
| Identifying results | identifying and classifying<br>Cycle A Autumn 2<br>Cycle A Summer 1<br>Cycle B Spring term<br>Cycle B Summer term | • identifying differences, similarities or changes related to simple scientific ideas and processes<br>Cycle A Aut 1<br>Cycle A Spring 2<br>Cycle A Summer<br>Cycle B Aut 2<br>Cycle B Summer | identifying scientific evidence that has been used to support or refute ideas or arguments<br>Cycle A Autumn<br>Cycle A Spring 1<br>Cycle A Spring 2<br>Cycle A Summer<br>Cycle B Aut 1 |
| Predicting and hypothesising | Using their observations and ideas to suggest answers to questions<br>Cycle A Spring term<br>Cycle B Spring term<br>Cycle B Summer term | • using straightforward scientific evidence to answer questions or to support their findings.<br>Cycle B Aut 2<br>Cycle A Aut 1 and 2<br>Cycle A Spring 1<br>Cycle A Spring 2 | using test results to make predictions to set up further comparative and fair tests<br>Cycle A Spring 1<br>Cycle B Aut 1<br>Cycle B Summer |

| **Sc1: Working scientifically** **Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:** | | | |
|---|---|---|---|
| | | • using results to draw simple conclusions, make predictions for new values and suggest improvements and raise further questions<br>Cycle A Aut 2<br>Cycle A Spring 1 and 2<br>Cycle A Summer<br>Cycle B Aut 2<br>Cycle B Spring 1 | **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<br>Cycle A Autumn<br>Cycle A Spring 1<br>Cycle A Summer<br>Cycle B Aut 1<br>Cycle B Summer |
| Reporting findings | Report what they have noticed either orally, in pictures or simple sentences.<br>All except Cycle B Autumn term | reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions<br>Cycle A Aut 1<br>Cycle A Spring 1<br>Cycle A Summer<br>Cycle B Aut 1 and 2<br>Cycle B Spring 1 | 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**<br>Cycle A Autumn<br>Cycle A Spring 1<br>Cycle A Summer<br>Cycle B Aut 1<br>Cycle B Summer |

| Sc2: Biology Plants: | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>Cycle B Spring term | Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br>Cycle B Spring 2 | |
| Identify and describe the basic structure of a variety of common flowering plants, including trees<br>Cycle B Spring/ Summer term | 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>Cycle B Spring 2 | |
| find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.<br>Cycle B Spring term | investigate the way in which water is transported within plants<br>Cycle B Spring 2 | |
| observe and describe how seeds and bulbs grow into mature plants<br>Cycle B Summer term | explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.<br>Cycle B Summer term | Describe the life process of reproduction in some **plants** (and Animals, including humans)<br>Cycle A Autumn 1 |

| Sc2: Biology Evolution & Inheritance | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | | Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.<br>Cycle A Autumn1 |
| | **From 'The Earth (Rocks, Atmosphere):**<br><br>Describe in simple terms how **fossils** are formed when things that have lived are trapped within rock.<br><br>Cycle B Autumn 2 | Identify how Animals, including humans and plants are adapted to suit their environment in different ways and that adaptation may lead to **evolution**<br><br>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>Cycle A Autumn1 |
| | | Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.<br>Cycle A Autumn1 |

| Sc2: Biology Living Things and their habitats: | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| Explore and compare the differences between things that are living, dead, and things that have never been alive.<br><br>Cycle A Autumn 1 | 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>Cycle B Autumn 2 | Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants, and animals<br><br>Cycle A Autumn1 |
| 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<br>Cycle A Summer 2 | Recognise that environments can change and that this can sometimes pose dangers to living things.<br><br>Cycle A Autumn 1 | Give reasons for classifying plants and animals based on special characteristics<br><br>Cycle A Autumn1 |
| Identify and name a variety of plants and animals in their habitats, including micro-habitats.<br>Cycle A Autumn 1 | | Describe the life process of reproduction in some plants and animals<br>Cycle A Autumn1 |
| 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.<br><br>Cycle A Autumn 2 | Construct and interpret a variety of **food chains**, identifying producers, predators and prey.<br><br>Cycle A Autumn 1 | |

| Sc2: Biology Animals, including humans | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br>Cycle A Autumn 1 | | |
| Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)<br>Cycle A Autumn 1 | | |
| Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.<br>Cycle A Autumn 1 | Identify that humans and some other animals have **skeletons and muscles** for support, protection and movement<br>Cycle B Autumn 2 | |
| Find out about and describe the basic needs of Animals, including humans,<br>including humans, for survival (water, food and air)<br>Cycle A Autumn 2 | | Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.<br>Cycle A Autumn1 |
| Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.<br><br>Cycle A Autumn 1 | | Describe the ways in which nutrients and water are transported within Animals, including humans,<br>Cycle B Autumn 1<br><br>Identify and name the main parts of the **circulatory system**, and explain the **functions of the heart, blood vessels and blood**.<br><br>Cycle B Autumn 1 |
| Notice that animals, including humans, including humans, have offspring which<br>grow into adults<br><br>Cycle A Autumn 1 | | • Describe the life processes of **reproduction** in some **Animals, including humans**<br>• Describe the changes as humans develop from birth to old age<br>• Describe the differences in the life cycles of mammal, amphibian, insect & bird<br>Cycle A and B – Summer term (covered through SRE) |

| | | |
|---|---|---|
| Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.<br>Cycle A Autumn 2 | Describe the simple **functions** of the basic parts of the **digestive system** in humans<br><br>Cycle A Autumn 2 | |
| Identify and name a variety of common animals that are **carnivores, herbivores and omnivores**<br><br>Cycle A Autumn 1 | identify that Animals, including humans, 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>Cycle A Autumn 2 | |
| | Identify the different types of **teeth** in humans and their simple functions<br>Cycle B Autumn 2 | |

| **Sc3: Chemistry Materials:** | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| distinguish between an object and the material from which it is made<br><br>Cycle A Summer 1<br>Cycle B Autumn term | compare and group materials together, according to whether they are solids, liquids or gases<br><br>Cycle A, Spring 1 | 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>Cycle B Autumn2 |
| **describe** the simple physical properties of a variety of everyday materials<br><br>**Identify** and name a variety of everyday materials, including wood, metal, plastic, glass, metal, water and rock<br><br>Cycle A Summer 1<br>Cycle B Autumn term | 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>Cycle A, Spring 1 | |

| | | |
|---|---|---|
| **compare** and **group** together a variety of everyday materials on the basis of their simple physical properties<br><br>Identify and **compare** the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses<br><br>Cycle B Autumn term | | **give reasons**, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic<br><br>Cycle B Autumn2 |
| (Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching)<br><br>Cycle A Summer 1, Cycle B Autumn term | identify the part played by **evaporation and condensation** in **the water cycle** and associate the rate of evaporation with temperature<br><br>Cycle A, Spring 1<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>Cycle A Spring 2 | Demonstrate that **dissolving**, mixing and changes of state are **reversible changes**.<br><br>Cycle B Autumn2 |
| | Use knowledge of solids, liquids and gases to decide how **mixtures** might be **separated**, including through filtering, sieving and evaporating<br><br>Cycle A Spring 2 | |
| | | 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**<br>Cycle B Autumn2 |

| Sc3: Chemistry The Earth : (Rocks, Atmosphere) | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | Recognise that that **soils** are made from rocks and organic matter<br>Cycle B Autumn 2 | |
| | Describe in simple terms how **fossils** are formed when things that have lived are trapped within rock.<br>Cycle B Autumn 2 | |
| | Compare and group together **different kinds of rocks** on the basis of their simple physical properties<br>Cycle B Autumn 2 | |

| Sc4: Physics Motion and forces: | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| **Materials**: Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.<br><br>Cycle A Summer 1<br>Cycle B Autumn term | | explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object<br>Cycle A Spring 1 |
| | Notice that some forces need contact between two objects, but magnetic forces can act at a distance<br><br>Cycle B Spring 1 | identify the effects of air resistance, water resistance and friction, that act between moving surfaces<br>Cycle A Spring 1 |
| | | Recognise that some mechanisms, including gears, pulleys, levers and springs, allow a smaller force to have a greater effect<br>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs<br>Cycle A Spring 1 |
| | Compare how things move on different surfaces<br>Cycle B Spring 1 | |

| Sc4: Physics Waves: Light | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | Notice that light is reflected from surfaces<br>Cycle A Summer term | Recognise that light appears to travel in straight lines<br>Cycle A Spring 2 |
| | Recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>Cycle A Summer term | 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>Cycle A Spring 2 |
| | Recognise that they need light in order to see things and that dark is the absence of light<br><br>Cycle A Summer term | 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. Cycle A Spring 2 |
| | Recognise that shadows are formed when the light from a light source is blocked by a solid object<br><br>Find patterns that determine the size of shadows.<br><br>Cycle A Summer term | use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.<br>Cycle A Spring 2 |

| Sc4: Physics Waves: Sound | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | | **Sound:**<br>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>Cycle B Spring |
| | | 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>Cycle B Spring |
| | | Recognise that sounds get fainter as the distance from the sound source increases<br>Cycle B Spring |

| Sc4: Physics Magnetism: | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | notice that some forces need contact between two objects and some forces act at a distance<br>Cycle B Spring 1 | |
| | 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.<br>Cycle B Spring 1 | |
| | observe how magnets attract or repel each other and attract some materials and not others<br>Cycle B Spring 1 | |
| | Describe magnets as having two poles<br>Cycle B Spring 1 | |
| | Predict whether two magnets will attract or repel each other, depending on which poles are facing<br>Cycle B Spring 1 | |

| Sc4: Physics Electricity: | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| | identify common appliances that run on electricity<br>Cycle B Autumn 1 | |
| | construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers<br>Cycle B Autumn 1 | Use recognised symbols when representing a simple circuit in a diagram<br>Cycle B Summer term |
| | 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>Cycle B Autumn 1 | associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit<br>Cycle B Summer term |
| | 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>Cycle B Autumn 1 | 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>Cycle B Summer term |
| | Recognise some common conductors and insulators, and associate metals with being good conductors.<br>Cycle B Autumn 1 | |

| Sc4: Physics Earth & Space | | |
|---|---|---|
| **KS1** | **Lower KS2** | **Upper KS2** |
| **Seasonal changes:**<br><br>observe changes across the four seasons<br>Cycle A Summer 2 | | describe the movement of the Earth and other planets relative to the Sun in the solar system<br>Cycle A Summer term |
| observe and describe weather associated with the seasons and how day length varies.<br>Cycle A Summer 2 | | describe the movement of the Moon relative to the Earth<br>Cycle A Summer term |
| | | describe the Sun, Earth and Moon as approximately spherical bodies<br>Cycle A Summer term |
| | | use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.<br>Cycle A Summer term |