

# Science Subject Content

## Working Scientifically

Working Scientifically is taught as an integral part of each science unit, introducing new knowledge and concepts, as outlined in the programme of study.

## Key Stage 1

In Years 1 and 2 the children will be developing their skills and understanding of 'Working Scientifically'. This includes:

- Asking simple **questions** and recognising that they can be answered in different ways
- **Observing** closely, using simple equipment
- Performing simple **tests**
- **Identifying** and **classifying**
- **Using their observations** and ideas to suggest answers to questions
- Gathering and **recording** data to help in answering questions.

## Lower Key Stage 2

In Years 3 and 4 the children extend their skills and understanding of 'Working Scientifically'. This includes:

- Asking relevant **questions** and using different types of scientific enquiries to answer them.
- Using straight forward **scientific evidence** to answer questions or to support their findings.
- Making systematic and careful **observations** and, where appropriate, taking accurate **measurements** using standard units, using a range of equipment, including thermometers and data loggers.
- Setting up simple practical **enquiries**, comparative and **fair tests**.
- **Identifying** differences, similarities or changes related to simple scientific ideas and processes.
- **Using results** to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- **Recording** findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

- Gathering, recording, classifying and presenting **data** in a variety of ways to help in answering questions.
- **Reporting** on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

## Upper Key Stage 2

In years 5 and 6 the children extend and refine their skills and understanding of 'Working Scientifically'. This includes:

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

See below for Programme of study for each year group

SCIENCE			
Year	Autumn	Spring	Summer
1	<p><b>The Seasons</b> - Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.</p> <p><b>Parts of animals</b> 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><b>Types of animals</b> Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p><b>The Seasons</b> - Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.</p> <p><b>Comparing Materials</b> - 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 simple physical properties.</p> <p><b>Identifying Materials</b> - 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.</p> <p><b>Parts of animals</b> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p><b>Types of animals</b> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p>	<p><b>The Seasons</b> - Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.</p> <p><b>Plants</b> – 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.</p> <p><b>Conclusion to Seasons work</b></p>

<p>2</p>	<p><b>Living Things</b> - Explore and compare the differences between things that are living, dead, and things that have never been alive. Notice that animals, including humans, have offspring which grow into adults</p> <p><b>Uses Of Materials</b> – Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p>	<p><b>Materials: Changing shapes</b> - Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p><b>Plants</b> - 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.</p>	<p><b>Habitats</b> - 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</p> <p><b>Feeding and Exercise</b> - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). 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. Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>
<p>3</p>	<p><b>Animals including humans</b> - 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 other animals have skeletons and muscles for support, protection and movement.</p> <p><b>Forces and magnets</b> - Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing. Observe how magnets attract or repel each other and</p>	<p><b>Rocks</b> - 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.</p>	<p><b>Plants</b> - 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.. Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p><b>Light</b> - Recognise that light is needed in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that shadows are formed when the light from a light source is blocked by a solid</p>

	<p>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.</p>		<p>object. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Find patterns in the way that the size of shadows change.</p>
4	<p><b>Electricity</b> - 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 some common conductors and insulators, and associate metals with being good conductors. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p><b>Sound</b> - 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 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.</p>	<p><b>Dangers to Living Things</b> - Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p><b>Human Nutrition</b> - 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.</p>	<p><b>Grouping Living Things</b> 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.</p> <p><b>Changes of State</b> - 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.</p>

<p>5</p>	<p><b>Life Cycles</b> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the changes as humans develop from birth to old age. Describe the life process of reproduction in some plants and animals.</p> <p><b>Earth and space</b> - Describe the Sun, Earth and Moon as approximately spherical bodies. Describe the movement of the Earth, and other planets, relative to the Sun 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. Describe the movement of the Moon relative to the Earth.</p>	<p><b>Separating Mixtures</b> Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p><b>Types of change</b> Demonstrate that dissolving, mixing and changes of state are reversible changes. 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.</p>	<p><b>Materials</b> 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. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p><b>Forces</b> - 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.</p>
<p>6</p>	<p><b>Light and sight</b> - 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. 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p> <p><b>Our Bodies</b> - Identify and name the main parts of the human circulatory system, and describe the functions of</p>	<p><b>Classifying living things</b> - 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.</p> <p><b>Changing circuits</b> - Use recognised symbols when representing a simple circuit in a diagram. 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</p>	<p><b>Evolution and inheritance</b> - 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.</p> <p><b>Review and celebration</b> - This unit differs from other units. Its purpose is to allow children to review what they have</p>

	<p>the heart, blood vessels and blood. Describe the ways in which nutrients and water are transported within animals, including humans. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p>	<p>give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</p>	<p>learnt in science throughout Key Stage 2. It is important for children to have an opportunity to revisit all aspects of the science they have learnt before moving on to high school.</p>
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