



Archbishop Hutton's  
Primary School



### Lower Key Stage 2 WORKING SCIENTIFICALLY

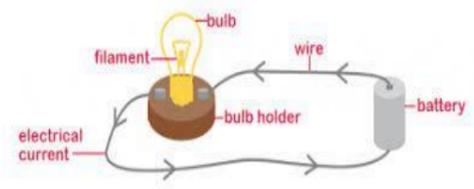
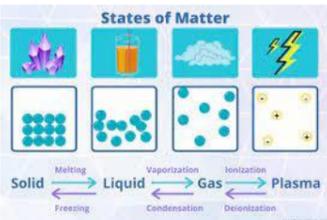
During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes, and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them.
- setting up simple practical enquiries, comparative, and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions.
- identifying differences, similarities or changes related to simple scientific ideas and processes.
- using straightforward scientific evidence to answer questions or to support their findings.

### NATIONAL CURRICULUM PROGRAMES OF STUDY

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing, and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships, and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping, and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

<p><b><u>Prior knowledge: Year 1/2</u></b></p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Y1</p> <p><b><u>Living things and their habitats.</u></b>          To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Y1          To identify and describe the basic structure of a variety of common flowering plants, including trees. Y1          To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Y1          To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Y1          To identify and name a variety of plants and animals in their habitats, including micro-habitats. Y2</p>	<p><b><u>Year Group Expectations: Year 3/4</u></b></p> <p><b><u>LIGHT Year 3</u></b>          To recognise that they need light to see things and that the dark is the absence of light.          To notice that light is reflected from surfaces.          To recognise that light from the sun can be dangerous and that there are ways to protect their eyes.          To recognise that shadows are formed when the light from a light source is blocked by a solid object.          To find patterns in the way that the size of shadows changes?</p> <p><b><u>Living things and their habitats.</u></b>          To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Y3          To recognise that living things can be grouped in a variety of ways. Y4          To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Y4          To recognise that environments can change and that this can sometimes pose dangers to living things. Y4</p>	<p><b><u>NC UKS2 expectations: Year 5/6</u></b></p> <p><b><u>LIGHT Year 6</u></b>          To recognise that light appears to travel in straight lines.          To 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?          To 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.          To 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><u>Living things and their habitats:</u></b>          To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Y5          To describe the life process of reproduction in some plants and animals. Y5          To 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. Y6          To give reasons for classifying plants and animals based on specific characteristics. Y6</p>
<p><b><u>Everyday Materials</u></b>          Pupils should be taught to:          To distinguish between an object and the material from which it is made. Y1          To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Y1          To describe the simple physical properties of a variety of everyday materials. Y1          To compare and group together a variety of everyday materials based on their simple physical properties. Y1          To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Y2          To find out how the shapes of solid objects made from some materials can be changed by</p>	<p><b><u>Everyday Materials</u></b>          To compare and group materials together, according to whether they are solids, liquids or gases. Y4          To 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). Y4          To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Y4</p>	<p><b><u>Everyday Materials:</u></b>          To compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. <u>Y5</u>          To understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. <u>Y5</u>          To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. <u>Y5</u>          To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. <u>Y5</u>          To demonstrate that dissolving, mixing and changes of state are reversible changes.</p>

<p>squashing, bending, twisting and stretch. Y2 To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, and cardboard for uses. Y3</p>		<p><u>Electricity:</u> To identify common appliances that run on electricity Y4 To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Y4 To 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 Y4 To know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Y4 To recognise some common conductors and insulators, and associate metals with being good conductors. Y4</p>		<p>To 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.Y5</p> <p><u>Electricity:</u> To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Y6 To 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. Y6 To use recognised symbols when representing a simple circuit in a diagram. Y6</p>	
SCIENCE	<b>Theme: SCIENCE AROUND US</b>	SCIENCE	<b>Theme: NATURAL WORLD</b>	SCIENCE	<b>Theme: MATERIALS</b>
<b>WHY DO I HAVE A SHADOW</b>		<b>WHAT IS AN INSECT</b>		<b>STATES OF MATTER &amp; ELECTRICITY</b>	
					 
	<p><b>Key Knowledge:</b></p> <ul style="list-style-type: none"> <li>• A light source is something that makes its own light.</li> <li>• We see objects because our eyes can sense light.</li> <li>• We need light to see things.</li> <li>• Burning light sources include the Sun, flames from a fire and stars.</li> <li>• Light is reflected off surfaces into our eyes.</li> <li>• Dark is the absence of light.</li> <li>• Shadows are formed when a light source is blocked by a solid object.</li> </ul>		<p><b>Key Knowledge:</b></p> <ul style="list-style-type: none"> <li>• How to group living things.</li> <li>• What are vertebrates?</li> <li>• What is the same and different about each one.</li> <li>• Use a key to classify invertebrate.</li> <li>• Create different ways of showing living things.</li> <li>• That the local environment can help and hinder living things.</li> <li>• That animals can become endangered and why.</li> </ul>		<p><b>Key Knowledge:</b></p> <p><b>ELECTRICITY</b></p> <ul style="list-style-type: none"> <li>• Where does electricity come from/</li> <li>• Which appliances run on electricity?</li> <li>• How does a circuit work?</li> <li>• What are electrical conductors and insulators</li> </ul> <p><b>STATES OF MATTER</b></p> <ul style="list-style-type: none"> <li>• What is a particle?</li> <li>• What is a solid?</li> <li>• What is a liquid?</li> <li>• What is a gas?</li> <li>• What happens to the particles in water when it is heated or cooled?</li> <li>• What is the water cycle?</li> </ul>

	<ul style="list-style-type: none"> <li>The size of the shadow depends on the position of the source, object, and surface.</li> <li>If the light source and object move closer to each other the shadow will become larger.</li> <li>We must never look directly at the Sun as the light produced is very bright and can be harmful to our eyes. This is why we wear sunglasses.</li> <li>Electric lights include lamps, car headlights and streetlight.</li> </ul>				
	<p><b>Procedural Knowledge</b></p> <ul style="list-style-type: none"> <li>Explore what a light source is.</li> <li>Explore which materials are the most reflective and would be good to keep us safe while outside in the dark.</li> <li>What type of material would be good to protect our eyes from the sun?</li> <li>How can you change the size and shape of shadows by using the same object?</li> <li>Explain why different objects are visible in different lighting and for different surfaces.</li> <li>Explain how shadows vary as the distance between a light source and an object is changed.</li> </ul>		<p><b>Procedural Knowledge</b></p> <ul style="list-style-type: none"> <li>Recognise that living things can be grouped in a variety of ways.</li> <li>Explore and use a classification key to group, identify and name a variety of living things. (plants, vertebrates, invertebrates),</li> <li>Compare the classification of common plants and animals to living things found in other places (under the sea, prehistoric),</li> <li>Recognise that environments can change, and this can sometimes pose a danger to living things.</li> <li>Give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment.</li> <li>Explore the work of pioneers in classification (e.g., Carl Linnaeus).</li> <li>Name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore).</li> <li>Measure using different equipment and units of measure.</li> <li>Record their observations in different ways? (labelled diagrams, charts etc).</li> <li>Describe what they have found using scientific language.</li> <li>Make accurate measurements using standard units.</li> <li>Use different ideas and suggest how to find something out.</li> <li>Make and record a prediction before testing.</li> </ul>		<p><b>Procedural Knowledge</b> <b>ELECTRICITY</b></p> <ul style="list-style-type: none"> <li>Research how to work safely with electricity.</li> <li>Make a variety of circuits, investigating which circuits work and why.</li> <li>Name the basic parts including cells, batteries, wires, bulbs, switches, motors and buzzers.</li> <li>Draw circuits using pictorial representations (not circuit symbols).</li> <li>Create circuits using switches. Investigate which materials are electrical conductors and insulators.</li> </ul> <p><b>STATES OF MATTER</b></p> <ul style="list-style-type: none"> <li>Group materials according to their states.</li> <li>Explain the particle structure of solids, liquids and gases.</li> <li>Explore the effect of temperature on substances such as chocolate, butter, cream. Compare their melting points and place them in a table.</li> <li>Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid.</li> <li>Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.</li> <li>Analyse and interpret different forms of data (tables, graphs) to show the effects of temperature on states of matter.</li> <li>Present what you know about the water cycle using a variety of skills using appropriate vocabulary</li> </ul>

		<ul style="list-style-type: none"> <li>Plan a fair test and explain why it was fair.</li> <li>Set up a simple fair test to make comparisons.</li> <li>Explain why they need to collect information to answer a question.</li> </ul>	<ul style="list-style-type: none"> <li>Observe evaporation and condensation in action by using bowls of water and mirrors /glass</li> </ul>
	<p><b>Key Vocabulary:</b> angle, bright, dark, dim, emits, light, mirror, opaque, reflects, reflective, shadows, source, sunglasses, surface, torches, translucent, transparent.</p>	<p><b>Key Vocabulary:</b> Amphibian, characteristic, classification, conservation, endangered, environment, extinct, global, habitat, hibernation, human impact, invertebrates, key, local, mammal, migrate, organism, reptile, variation, vertebrates, wildlife,</p>	<p><b>Key Vocabulary:</b> <b>ELECTRICITY:</b> appliances, battery, bulb, buzzer, cell, circuit, component, conductor, crocodile clip, current, device, electricity, energy, fuel, generate, insulator, mains, metal, motor, negative, non-metal, plug, positives, power, source, switch, symbol, wires <b>STATES OF MATTER:</b> condensation, cooling, evaporation, freezing, freezing point, gas, heating, liquid, melting, melting point, particles, precipitation, process, properties, solid, temperature, vibration, water cycle, water vapour</p>
	<p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Can describe how we see objects in light and can describe dark as the absence of light.</li> <li>Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses.</li> <li>Can define transparent, translucent, and opaque.</li> <li>Can describe how shadows are formed by objects blocking light.</li> </ul>	<p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Can name living things living in a range of habitats, giving the key features that helped them to identify them</li> <li>Can give examples of how an environment may change both naturally and due to human impact</li> <li>Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)</li> <li>Can use classification keys to identify unknown plants and animals</li> <li>Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter</li> </ul>	<p><b>Assessment:</b> <b>Electricity:</b></p> <ul style="list-style-type: none"> <li>Can name the components in a circuit</li> <li>Can make electric circuits</li> <li>Can control a circuit using a switch</li> <li>Can name some metals that are conductors</li> <li>Can name materials that are insulators</li> <li>Can communicate structures of circuits using drawings which show how the components are connected</li> <li>Use classification evidence to identify that metals are good conductors and non-metals are insulators</li> <li>Can incorporate a switch into a circuit to turn it on and off</li> <li>Can connect a range of different switches identifying the parts that are insulators and conductors</li> <li>Can add a circuit with a switch to a DT project and can demonstrate how it works</li> <li>Can give reasons for choice of materials for making different parts of a switch</li> <li>Can describe how their switch works</li> </ul> <p><b>States of Matter:</b></p> <ul style="list-style-type: none"> <li>Can create a concept map, including arrows linking the key vocabulary</li> <li>Can name properties of solids, liquids and gases</li> <li>Can give everyday examples of melting and freezing</li> <li>Can give everyday examples of evaporation and condensation</li> <li>Can describe the water cycle</li> <li>Can give reasons to justify why something is a solid liquid or gas</li> <li>Can give examples of things that melt/freeze and how their melting points vary</li> <li>From their observations, can give the melting points of some materials</li> </ul>

					<ul style="list-style-type: none"><li>• Using their data, can explain what affects how quickly a solid melts</li><li>• Can measure temperatures using a thermometer</li><li>• Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup from their data, can explain how to speed up or slow down evaporation</li><li>• Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet</li></ul>
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