

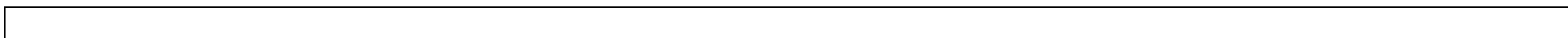


# Whole School Overview

## Science

# Reception

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To explore creatures, people, plants and objects in their natural environments.</li> <li>• To observe and manipulate objects and materials</li> <li>• To identify differences and similarities.</li> </ul> <p><b>Areas include:</b>            Knowledge and Understanding of the World            Mini beasts (insects)            Animals            Plants            Ourselves            Water Seasons and weather</p>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Show curiosity about objects, events and people.</li> <li>• Playing &amp; Exploring</li> <li>• Questions why things happen</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Engage in open-ended activity.</li> <li>• Playing &amp; Exploring</li> <li>• Choose the resources they need for their chosen activities</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Take a risk, engage in new experiences and learn by trial and error</li> <li>• Playing &amp; Exploring</li> <li>• Handle equipment and tools safely and effectively</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• Make links and notice patterns in their experience</li> <li>• Creating &amp; Thinking Critically</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Develop ideas of grouping, sequences, cause and effect</li> <li>• Creating &amp; Thinking Critically</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Create simple representations of events, people and objects.</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>• Make observations of animals and plants and explain why some things occur, and talk about changes</li> <li>• <b>ELG:</b> Speaking Builds up vocabulary that reflects the breadth of their experience</li> <li>• <b>Understanding:</b> Use their observations and ideas to suggest answers to questions</li> <li>• Talk about what they have found out and how they found it out</li> </ul>	



# Year 1

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To ask simple questions and recognising that they can be answered in different ways</li> <li>• To observe closely, using simple equipment</li> <li>• To perform simple tests</li> <li>• To identify and classify using their observations and ideas to suggest answers to questions</li> <li>• To gather and record data to help in answering questions.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Asks questions raised by their own exploration of the world around them.</li> <li>• Draw on their everyday experiences to help answer questions.</li> <li>• Begin to use simple features to compare objects, materials and living things.</li> <li>• Ask people questions to find answers.</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Experience different types of science enquiries, including practical activities</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Begin to recognise different ways in which they might answer scientific questions</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• Observe closely using simple equipment With help, observe changes over time</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Use simple features to compare objects, materials and living things.</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Ask people questions and use simple secondary sources to find answers</li> <li>• Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>• Use their observations and ideas to suggest answers to questions</li> <li>• Talk about what they have found out and how they found it out.</li> </ul>	<p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word and spelling knowledge at Key Stage 1.</p>

<b>Plants</b>		
<ul style="list-style-type: none"> <li>• To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li> <li>• To identify and describe the basic structure of a variety of common flowering plants.</li> <li>• including trees.</li> </ul>	<ul style="list-style-type: none"> <li>• Learn about what a plant is, then either go plant hunting, or plant seeds.</li> <li>• Identify the main parts of a variety of plants and describe their functions.</li> <li>• Either examine plants (and identify features) or draw and label plant diagrams.</li> <li>• Identify ways in which plants change over time. Either study and describe plants they have grown themselves, or identify ways in which plants around school have changed over time.</li> <li>• Identify and name trees, then learn some differences between deciduous and evergreen trees.</li> <li>• Sort trees into groups or go tree hunting.</li> <li>• Learn about a variety of common garden plants and identify some of their features, and consider why they are appealing to people, e.g. easy to grow, or attracts insects.</li> <li>• Learn how plants have similar life processes to animals and why plants may die.</li> <li>• Plant scraps and cuttings which re-grow, or identify dead and dying plants.</li> </ul>	<p><b>Challenge:</b> Pupils can name the parts of flowering plants.</p>
<b><u>Working Scientifically:</u></b>		
<ul style="list-style-type: none"> <li>• Use magnifying glasses,</li> <li>• Draw diagrams</li> <li>• Keep records</li> </ul>		
<b>Animals Including Humans</b>		
<ul style="list-style-type: none"> <li>• To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>• To identify and name a variety of common animals that are carnivores, herbivores and</li> </ul>	<ul style="list-style-type: none"> <li>• Become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.</li> <li>• Compare animals using videos and photographs</li> </ul>	<p><b>Challenge:</b> Pupils can name some parts of the human body that</p>

<p>omnivores</p> <ul style="list-style-type: none"> <li>To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</li> <li>To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul>	<ul style="list-style-type: none"> <li>Group animals according to what they eat.</li> <li>Learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</li> <li>Use their senses to compare different textures, sounds and smells.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Compare using videos and photographs.</li> <li>Group animals according to what they eat.</li> <li>Use their senses to compare different textures, sounds and smells.</li> </ul>	<p>cannot be seen.</p>
<p><b>Everyday Materials</b></p>		
<ul style="list-style-type: none"> <li>To distinguish between an object and the material from which it is made</li> <li>To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li> <li>To describe the simple physical properties of a variety of everyday materials</li> <li>To compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	<ul style="list-style-type: none"> <li>Explore, name, discuss and raise and answer questions about everyday materials</li> <li>Become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</li> <li>Explore and experiment with a wide variety of materials including for example: brick, paper, fabrics, elastic, and foil.</li> <li>Sort materials based on their physical properties.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Perform simple tests to explore questions, for example: 'What is the best material for an umbrella? ... for lining a dog basket? ... for curtains? ... for a bookshelf? ... for a gymnast's leotard?'</li> </ul>	<p><b>Challenge:</b> Pupils can explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate. Or what happens when they are cooled, e.g. jelly.</p>

<b>Seasonal Changes</b>		
<ul style="list-style-type: none"> <li>• To observe changes across the four seasons</li> <li>• To observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the weather they can directly observe and other types of weather they know of.</li> <li>• Describe what the weather is normally like during different seasons, and what people might wear in different weather conditions</li> <li>• Study images, looking for clues as to which season it is – including weather conditions and plant growth.</li> <li>• Consider ways in which the changing conditions of the seasons affect the lives of animals.</li> <li>• Learn about how humans adapt their behaviour to survive during the changing seasons.</li> <li>• Explore in detail the ways in which clothing worn may change, or what food is available at different times of year.</li> <li>• Learn how the length of day and night, and the times at which they occur, change throughout the year.</li> <li>• Complete given pictograms using sets of data to show changes in weather, or frequency of different types of clothes worn, during each season.</li> <li>• Be aware that it is not safe to look directly at the sun, even when wearing dark sunglasses.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Make tables and charts about the weather</li> <li>• Make displays of what happens in the world around them, including day length, as the seasons change.</li> </ul>	<p><b>Challenge:</b> Pupils can talk about weather variation in different parts of the world.</p>

## Year 2

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To ask simple questions and recognising that they can be answered in different ways</li> <li>• To observe closely, using simple equipment</li> <li>• To perform simple tests</li> <li>• To identify and classify using their observations and ideas to suggest answers to questions</li> <li>• To gather and record data to help in answering questions.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Asks questions raised by their own exploration of the world around them.</li> <li>• Draw on their everyday experiences to help answer questions.</li> <li>• Ask people questions to find answers.</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Experience different types of science enquiries, including practical activities</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Carry out simple tests.</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• With guidance begin to notice patterns and relationships.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data Record simple data</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>• With help, record and communicate their findings in a range of ways and begin to use simple scientific language.</li> </ul>	<p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word and spelling knowledge at Key Stage 1.</p>
<b>Living Things And Their Habitats</b>		
<ul style="list-style-type: none"> <li>• To explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>• To identify that most living things live in</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that all living things have certain characteristics that are essential for keeping them alive and healthy</li> <li>• Raise and answer questions that help them to become familiar with the life processes that are common to all living</li> </ul>	<p><b>Challenge:</b> Pupils can describe what animals need to survive and link this</p>



<p>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</p> <ul style="list-style-type: none"> <li>• To identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• To 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.</li> </ul>	<p>things.</p> <ul style="list-style-type: none"> <li>• Be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'microhabitat' (a very small habitat e.g. for woodlice under stones, logs or leaf litter).</li> <li>• Raise and answer questions about the local environment.</li> <li>• Identify and study a variety of plants and animals within their habitat and observe how living things depend on each other e.g. plants serving as a source of food and shelter for animals.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Sort and classify things according to whether they are living, dead or were never alive</li> <li>• Record their findings using charts Describe how they decided where to place things</li> <li>• Explore questions like: 'Is a flame alive? Is a deciduous tree dead in winter?'</li> <li>• Talk about ways of answering their questions</li> <li>• Construct a simple food chain that includes humans (e.g., grass, cow, human)</li> <li>• Describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes)</li> <li>• Find out how the conditions affect the number and type(s) of plants and animals that live there</li> </ul>	<p>to their habitats.</p>
<p><b>Plants</b></p>		
<ul style="list-style-type: none"> <li>• To observe and describe how seeds and bulbs grow into mature plants</li> <li>• To find out and describe how plants need water,</li> </ul>	<ul style="list-style-type: none"> <li>• Use the local environment to observe how plants grow.</li> <li>• Understand the requirements of plants for germination, growth and survival and the processes of reproduction and growth in</li> </ul>	<p><b>Challenge:</b> Pupils can explain that plants grow and time</p>

<p>light and a suitable temperature to grow and stay healthy</p>	<p>plants.</p> <ul style="list-style-type: none"> <li>• Know that seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Observe and record, with some accuracy, the growth of a variety of plants as they change over</li> <li>• Observe similar plants at different stages of growth; Set up a comparative test to show that plants need light and water to stay healthy.</li> </ul>	<p>from a seed or bulb.</p>
<p><b>Animals Including Humans</b></p>		
<ul style="list-style-type: none"> <li>• To notice that animals, including humans, have offspring which grow into adults</li> <li>• To find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>• To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans</li> <li>• Be introduced to the processes of reproduction and growth in animals</li> <li>• Answer questions that help to recognise growth; they should not be expected to understand how reproduction occurs.- e.g. egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, and adult.</li> </ul> <p><b><u>Working scientifically:</u></b> Observe through video or first-hand how different animals, including humans, grow Ask questions about what things animals need for survival and what humans need to stay healthy. Suggest ways to find answers to their questions</p>	<p><b>Challenge:</b> Pupils can explain that animals reproduce in different ways</p>
<p><b>Use Of Everyday Materials</b></p>		
<ul style="list-style-type: none"> <li>• To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and discuss every day the uses of every day materials</li> <li>• Become familiar with how some materials are used for more</li> </ul>	<p><b>Challenge:</b> Pupils can describe the different properties of</p>

<p>cardboard for particular uses</p> <ul style="list-style-type: none"> <li>• To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul>	<p>than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles)</p> <ul style="list-style-type: none"> <li>• Become familiar with how different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass)</li> <li>• Understand the properties of materials that make them suitable or unsuitable for particular purposes.</li> <li>• Think about unusual and creative uses for everyday materials.</li> <li>• Research people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Compare the uses of everyday materials in and around the school with materials found in other places</li> <li>• Observe closely, to identify and classify the uses of different materials, and record their observations.</li> </ul>	<p>materials using words like, transparent or opaque, flexible, etc</p>
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## Year 3

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To ask relevant questions and use different types of scientific enquiries to answer them</li> <li>• To set up simple practical enquiries, comparative and fair tests</li> <li>• To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>• To gather, record, classify and present data in a variety of ways to help in answering questions</li> <li>• To record findings using simple scientific language, draw labelled diagrams, keys, bar charts, and tables</li> <li>• To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• To identify differences, similarities or changes related to simple scientific ideas and processes</li> <li>• To use straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Ask questions raised by their own exploration of the world around them.</li> <li>• Draw on their everyday experiences to help answer questions.</li> <li>• Ask people questions to find answers.</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Be given a range of scientific experiences including different types of science enquiries to answer questions</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Set up simple practical enquiries, comparative and fair tests.</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• Make systematic and careful observations With some help, make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Talk about criteria for grouping, sorting and classifying; and use simple keys</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</li> <li>• Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys.</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p>	<p>Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.</p>

	<ul style="list-style-type: none"> <li>• With help, look for changes, patterns, similarities and differences in their data in order to draw simple and answer questions</li> <li>• Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• With support, identify new questions arising from the data.</li> </ul>	
<b>Plants</b>		
<ul style="list-style-type: none"> <li>• To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>• To 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.</li> <li>• To investigate the way in which water is transported within plants.</li> <li>• To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce the relationship between structure and function: the idea that every part has a job to do.</li> <li>• Explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.</li> <li>• Be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertilizer.</li> <li>• Discover how seeds are formed by observing the different stages of plant life cycles over a period of time;</li> <li>• Look for patterns in the structure of fruits that relate to how the seeds are dispersed. <ul style="list-style-type: none"> <li>• Observe how water is transported in plants e.g. by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.</li> </ul> </li> </ul>	<p><b>Challenge:</b> Pupils can classify a range of common plants according to many criteria (environment found, size, climate required, etc.)</p>
<b>Animals Including Humans</b>		
<ul style="list-style-type: none"> <li>• To identify that animals, including humans, need the right types and amount of nutrition, and that</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to learn about the importance of nutrition</li> <li>• Be introduced to the main body parts associated with the</li> </ul>	<p><b>Challenge:</b> Pupils can explain how the</p>

<p>they cannot make their own food; they get nutrition from what they eat</p> <ul style="list-style-type: none"> <li>• To identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<p>skeleton and muscles.</p> <ul style="list-style-type: none"> <li>• Find out how different parts of the body have special functions.</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Identify and group animals with and without skeletons.</li> <li>• Observe and compare their movement.</li> <li>• Explore ideas about what would happen if humans did not have skeletons.</li> <li>• Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.</li> <li>• Research different food groups and how they keep us healthy, and design meals based on what they find out.</li> </ul>	<p>muscular and skeletal systems work together to create movement.</p>
<p><b>Rocks</b></p>		
<ul style="list-style-type: none"> <li>• To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>• To describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>• To recognise that soils are made from rocks and organic matter</li> </ul>	<ul style="list-style-type: none"> <li>• Explore different kinds of rocks and soils, including those in the local environment (link to Geography)</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Observe rocks, including those used in buildings and gravestones exploring how and why they might have changed over time,</li> <li>• Use a hand lens or microscope to help identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.</li> <li>• Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.</li> <li>• Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur</li> </ul>	<p><b>Challenge:</b> Pupils can classify igneous and sedimentary rocks.</p>

	<p>when they are in water.</p> <ul style="list-style-type: none"> <li>• Raise and answer questions about the way soils are formed.</li> </ul>	
<b>Light</b>		
<ul style="list-style-type: none"> <li>• To recognise that light is needed in order to see things and that dark is the absence of light.</li> <li>• To notice that light is reflected from surfaces.</li> <li>• To recognise that light from the sun can be dangerous and that there are ways to protect our eyes.</li> <li>• To recognise that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>• To find patterns in the way that the size of shadows change.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore what happens when light reflects off a mirror or other reflective surfaces.</li> <li>• Use mirror games to help to answer questions about how light behaves.</li> <li>• Think about why it is important to protect their eyes from bright lights.</li> <li>• Understand that it is not safe to look directly at the sun, even when wearing dark glasses.</li> <li>• Observe and measure shadows, and find out how they are formed and what might cause the shadows to change.</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.</li> </ul>	<p><b>Challenge:</b> Pupils can explain the difference between transparent, translucent and opaque</p>
<b>Forces and Magnets</b>		
<ul style="list-style-type: none"> <li>• To compare how things move on different surfaces</li> <li>• To notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>• To observe how magnets attract or repel each other and attract some materials and not others</li> <li>• To 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</li> </ul>	<ul style="list-style-type: none"> <li>• Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing).</li> <li>• Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Compare how different things move and group them.</li> <li>• Raise questions and carry out tests to find out how far things move on different surfaces.</li> </ul>	<p><b>Challenge:</b> Pupils can explore the strengths of different magnets and find a fair way to compare them.</p>

- To describe magnets as having two poles
- To predict whether two magnets will attract or repel each other, depending on which poles are facing.

- Gather and record data to find answers to their questions.
- Sorting materials into those that are magnetic and those that are not.
- Look for patterns in the way that magnets behave in relation to each other and what might affect this, e.g. the strength of the magnet or which pole faces another.
- Identify how these properties make magnets useful in everyday items.
- Suggest creative uses for different magnets



## Year 4

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To ask relevant questions and use different types of scientific enquiries to answer them</li> <li>• To set up simple practical enquiries, comparative and fair tests</li> <li>• To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>• To gather, record, classify and present data in a variety of ways to help in answering questions</li> <li>• To record findings using simple scientific language, draw labelled diagrams, keys, bar charts, and tables</li> <li>• To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• To identify differences, similarities or changes related to simple scientific ideas and processes</li> <li>• To use straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Asks questions raised by their own exploration of the world around them.</li> <li>• Draw on their everyday experiences to help answer questions.</li> <li>• Ask people questions to find answers.</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Recognise when a simple fair test is necessary and help to decide how to set it up</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Talk about criteria for grouping, sorting and classifying; and use keys</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Collect and record data from their own observations and measurements in a variety of ways: bar charts and tables, standard units, labelled diagrams, keys and help to make decisions about how to analyse this data</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>• Make predictions for new values within or beyond the data they have collected and find ways of improving what they have already done</li> </ul>	<p>Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.</p>

## Living Things And Their Habitats

- To recognise that living things can be grouped in a variety of ways.
- To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- To recognise that environments can change and that this can sometimes pose dangers to living things

- Use the local environment to raise and answer questions that help to identify and study plants and animals in their habitat.
- Identify how the habitat changes throughout the year.
- Explore possible ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants.
- Begin to put vertebrate animals into groups, e.g.: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Understand that plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, e.g. ferns and mosses.
- Explore examples of human impact (both positive and negative) on environments, e.g., the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.

### Working Scientifically:

- Use and make simple guides or keys to explore and identify local plants and animals.
- Make a guide to local living things.
- Raise and answer questions based on observations of animals and what they have found out about other animals that they have researched.

**Challenge:** To research the work of pioneers in classification e.g. Carl Linnaeus.

## Animals Including Humans

- To describe the simple functions of the basic parts of the digestive system in humans.
- To identify the different types of teeth in humans and their simple functions.

- Begin to know the main body parts associated with the digestive system, e.g.: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine.

**Challenge:** Pupils can explain how certain living

<ul style="list-style-type: none"> <li>To construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	<ul style="list-style-type: none"> <li>Explore questions that help them to understand the special functions of these body parts.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Compare the teeth of carnivores and herbivores and suggest reasons for differences.</li> <li>Research what damages teeth and how to look after them.</li> <li>Draw and discuss their ideas about the digestive system and compare them with models or images.</li> </ul>	<p>things depend on one another to survive.</p>
<p><b>States of Matter</b></p>		
<ul style="list-style-type: none"> <li>To compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>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)</li> <li>To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<ul style="list-style-type: none"> <li>Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).</li> <li>Observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled.</li> <li>Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Group and classify a variety of different materials.</li> <li>Explore the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party).</li> <li>Observe and record evaporation over a period of time e.g., a puddle in the playground or washing on a line.</li> <li>Investigate the effect of temperature on washing drying or snowmen melting</li> </ul>	<p><b>Challenge:</b></p> <p>To research the temperature at which materials change state e.g., when iron melts or when oxygen condenses into a liquid</p>

## Sound

- To identify how sounds are made, associating some of them with something vibrating.
- To recognise that vibrations from sounds travel through a medium to the ear.
- To find patterns between the pitch of a sound and features of the object that produced it.
- To find patterns between the volume of a sound and the strength of the vibrations that produced it.
- To recognise that sounds get fainter as the distance from the sound source increases.

- Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world.
- Find out how the pitch and volume of sounds can be changed in a variety of ways.

### Working scientifically:

- Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.
- Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.
- Make and play their own instruments by using what they have found out about pitch and volume..

**Challenge:** Pupils can work out which materials give the best insulation for sound and explain why.

## Electricity

- To identify common appliances that run on electricity
- To construct a simple series electrical circuit.
- To identify and name the basic parts of a circuit, including cells, wires, bulbs, switches and buzzers.
- 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.
- To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- To recognise some common conductors and insulators, and associate metals with being good conductors

- Construct simple series circuits,
- Use different components, for example, bulbs, buzzers and motors, and including switches.
- Use their circuits to create simple devices.
- Draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage (these will be introduced in year 6).
- Children might use the terms current and voltage, but these should not be introduced or defined formally at this stage.
- Children should be taught about precautions for working safely with electricity.

### Work scientifically:

**Challenge:** Pupils can work out which metals can be used to connect across a gap in a circuit.

	<ul style="list-style-type: none"><li>• Observe patterns e.g. that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.</li></ul>	
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# Year 5

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</li> <li>To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</li> <li>To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</li> <li>To use test results to make predictions to set up further comparative and fair tests.</li> <li>To report and present 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.</li> <li>To identify scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>Asks questions raised by their own exploration of the world around them.</li> <li>Use their science experiences to explore ideas and raise different kinds of questions.</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>Talk about how scientific ideas have developed over time Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>Make their own decisions about what observations to make, what measurements to use and how long to make them for.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>Use and develop keys and other information records to identify, classify and describe living things and materials,</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>Identify scientific evidence that has been used to support or refute ideas or arguments Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas,</li> </ul>	<p>Pupils should read, spell and pronounce scientific vocabulary correctly.</p>
<b>Living Things And Their Habitats</b>		
<ul style="list-style-type: none"> <li>To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>To describe the life process of reproduction in</li> </ul>	<ul style="list-style-type: none"> <li>Study and raise questions about the local environment.</li> <li>Observe life-cycle changes in a variety of living things e.g. plants in the vegetable garden or flower border, and</li> </ul>	<p><b>Challenge:</b> To research different types of</p>

<p>some plants and animals.</p>	<p>animals in the local environment.</p> <ul style="list-style-type: none"> <li>• Research the work of naturalists and animal behaviourists e.g. David Attenborough and Jane Goodall.</li> </ul> <p><b><u>Working Scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times).</li> <li>• Ask relevant questions and suggest reasons for similarities and differences.</li> <li>• Grow new plants from different parts of the parent plant e.g. seeds, stem and root cuttings, tubers, bulbs.</li> <li>• Observe changes in an animal over a period of time (e.g. by hatching and rearing chicks),</li> <li>• Compare how different animals reproduce and grow.</li> </ul>	<p>reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.</p>
<p><b>Animals Including Humans</b></p>		
<ul style="list-style-type: none"> <li>• To describe the changes as humans develop to old age.</li> </ul>	<ul style="list-style-type: none"> <li>• Draw a timeline to indicate stages in the growth and development of humans.</li> <li>• Learn about the changes experienced in puberty.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Research the gestation periods of other animals and compare them with humans.</li> <li>• Find out and record the length and mass of a baby as it grows.</li> </ul>	<p><b>Challenge:</b> Pupils can create a timeline to include stages of growth in certain animals, such as frogs and butterflies.</p>
<p><b>Properties and Changes of Materials</b></p>		
<ul style="list-style-type: none"> <li>• To 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.</li> </ul>	<p>Build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4.</p>	<p><b>Challenge:</b> Pupils can find out about how chemists create new</p>

<ul style="list-style-type: none"> <li>• To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</li> <li>• To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li> <li>• To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>• To demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.</li> <li>• Explore changes that are difficult to reverse e.g. burning, rusting and other reactions e.g. vinegar with bicarbonate of soda.</li> </ul> <p><b>Note:</b> Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some</p> <p><b>Working scientifically:</b></p> <ul style="list-style-type: none"> <li>• Carry out tests to answer questions e.g. ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’</li> <li>• Compare materials in order to make a switch in a circuit.</li> <li>• Observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes.</li> <li>• Research and discuss how chemical changes have an impact on our lives e.g. cooking.</li> <li>• Discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.</li> </ul>	<p>materials, e.g. Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p>
<p><b>Earth and Space</b></p>		
<ul style="list-style-type: none"> <li>• To describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</li> <li>• To describe the movement of the Moon relative to the Earth.</li> <li>• To describe the Sun, Earth and Moon as approximately spherical bodies</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce a model of the sun and Earth that enables children to explain day and night.</li> <li>• Learn that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a ‘dwarf planet’ in 2006).</li> </ul>	<p><b>Challenge:</b> To research the way that ideas about the solar system have developed, understanding how</p>



<ul style="list-style-type: none"> <li>To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	<ul style="list-style-type: none"> <li>Understand that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones).</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Compare the time of day at different places on the Earth through internet links and direct communication. Create simple models of the solar system.</li> <li>Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.</li> <li>Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.</li> </ul>	<p>the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.</p>
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**Forces**

<ul style="list-style-type: none"> <li>To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>To identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</li> <li>To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul>	<ul style="list-style-type: none"> <li>Explore falling objects and raise questions about the effects of air resistance.</li> <li>Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.</li> <li>Experience forces that make things begin to move, get faster or slow down.</li> <li>Explore the effects of friction on movement and find out how it slows or stops moving objects e.g. by observing the effects of a brake on a bicycle wheel.</li> <li>Explore the effects of levers, pulleys and simple machines on movement.</li> </ul> <p><b><u>Work scientifically:</u></b></p> <ul style="list-style-type: none"> <li>Explore falling paper cones or cupcake cases.</li> <li>Design and make a variety of parachutes.</li> <li>Carry out fair tests to determine which designs are the most effective.</li> <li>Explore resistance in water by making and testing boats of</li> </ul>	<p><b>Challenge:</b> To research how scientists e.g. Galileo Galilei and Isaac Newton helped to develop the theory of gravitation</p>
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	different shapes.	
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- Design and make products that use levers, pulleys, gears and/or springs and explore their effects.

## Year 6

Learning Objectives	Key Skills	Notes
<b>Working Scientifically</b>		
<ul style="list-style-type: none"> <li>• To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</li> <li>• To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</li> <li>• To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</li> <li>• To use test results to make predictions to set up further comparative and fair tests.</li> <li>• To report and present 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.</li> <li>• To identify scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p><b>Asking Questions</b></p> <ul style="list-style-type: none"> <li>• Asks questions raised by their own exploration of the world around them.</li> <li>• Use their science experiences to explore ideas and raise different kinds of questions</li> </ul> <p><b>Planning and setting up different types of enquiries</b></p> <ul style="list-style-type: none"> <li>• Continue to select and plan the most appropriate type of scientific enquiry to use to answer scientific questions</li> </ul> <p><b>Performing tests and using equipment</b></p> <ul style="list-style-type: none"> <li>• Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</li> </ul> <p><b>Observing and measuring</b></p> <ul style="list-style-type: none"> <li>• Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>• Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment</li> </ul> <p><b>Gathering and recording data</b></p> <ul style="list-style-type: none"> <li>• Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately.</li> <li>• Take repeat measurements where appropriate.</li> <li>• Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> </ul> <p><b>Reporting, presenting and communicating data/findings</b></p> <ul style="list-style-type: none"> <li>• Use oral and written forms such as displays and other</li> </ul>	<p>Pupils should read, spell and pronounce scientific vocabulary correctly.</p>

	<p>presentations to report conclusions, causal relationships and explanations of degree of trust in results.</p> <ul style="list-style-type: none"> <li>• Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.</li> </ul>	
<p><b>Living Things And Their Habitats</b></p>		
<ul style="list-style-type: none"> <li>• 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.</li> <li>• To give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>• Build on their knowledge of grouping living things in year 4 by looking at the classification system in more detail.</li> <li>• Introduce the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided.</li> <li>• Make direct observations where possible.</li> <li>• Classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).</li> <li>• Discuss reasons why living things are placed in one group and not another.</li> </ul> <p><b><u>Working Scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Use classification systems and keys to identify some animals and plants in the immediate environment.</li> <li>• To research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.</li> </ul>	<p><b>Challenge:</b> To research the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.</p>
<p><b>Animals Including Humans</b></p>		
<ul style="list-style-type: none"> <li>• To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>• To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>• To describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul>	<ul style="list-style-type: none"> <li>• Build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system).</li> <li>• Explore and answer questions about how the circulatory system enables the body to function. • Understand how to keep their bodies healthy.</li> <li>• Understand how their bodies might be damaged – including</li> </ul>	<p><b>Challenge:</b> Pupils can make a diagram of the human body that outlines the main parts and explain how the different parts work</p>

	<p>how some drugs and other substances can be harmful to the human body</p> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</li> </ul>	<p>and depend on one another.</p>
<p><b>Evolution and Inheritance</b></p>		
<ul style="list-style-type: none"> <li>• To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>• To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>• To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul>	<ul style="list-style-type: none"> <li>• Build on knowledge of fossils from rocks in year 3. Find out more about how living things on earth have changed over time.</li> <li>• Understand the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when e.g. Labradors are crossed with poodles.</li> <li>• Understand that variation in offspring over time can make animals more or less able to survive in particular environments e.g. by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox.</li> <li>• Research the work of paleontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.</li> </ul> <p><b>Note:</b> Pupils are not expected to understand how genes and chromosomes work.</p> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Observe and raise questions about local animals and how they are adapted to their environment.</li> <li>• Compare how some living things are adapted to survive in extreme conditions e.g. cactuses, penguins and camels</li> <li>• Analyse the advantages and disadvantages of specific</li> </ul>	<p><b>Challenge:</b></p> <p>Pupils can analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet.</p>

	<p>adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.</p>	
<p><b>Light</b></p>		
<ul style="list-style-type: none"> <li>• To recognise that light appears to travel in straight lines.</li> <li>• 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.</li> <li>• 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</li> <li>• To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> </ul>	<ul style="list-style-type: none"> <li>• Build on knowledge of light from year 3.</li> <li>• Explore the way that light behaves, including light sources, reflection and shadows.</li> <li>• Discuss observations and make predictions.</li> </ul> <p><b><u>Working scientifically:</u></b></p> <ul style="list-style-type: none"> <li>• Decide where to place rear-view mirrors on cars.</li> <li>• Design and make a periscope and use the idea that light appears to travel in straight lines to explain how it works.</li> <li>• Investigate the relationship between light sources, objects and shadows by using shadow puppets.</li> </ul>	<p><b>Challenge:</b> Pupils can extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur)</p>
<p><b>Electricity</b></p>		
<ul style="list-style-type: none"> <li>• To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>• 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.</li> <li>• To use recognised symbols when representing a simple circuit in a diagram.</li> </ul>	<ul style="list-style-type: none"> <li>• Build on their knowledge of electricity from year 4.</li> <li>• Construct simple series circuits, to help them to answer questions about what happens when they try different components e.g. switches, bulbs, buzzers and motors.</li> <li>• Learn how to represent a simple circuit in a diagram using recognised symbols.</li> <li>• <b>Note:</b> Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.</li> </ul> <p><b><u>Work scientifically:</u></b></p>	<p><b>Challenge:</b> To research how scientists e.g. Galileo Galilei and Isaac Newton helped to develop the theory of gravitation</p>

	<ul style="list-style-type: none"><li>• Systematically identify the effect of changing one component at a time in a circuit.</li><li>• Design and make a set of traffic lights, a burglar alarm or some other useful circuit.</li></ul>	
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