



## Whole School Curriculum Progression: Science

**Thinking as a Scientist:** Asking questions; observations & measurements; practical enquiry; recording & presenting evidence; forming conclusions & answering questions; evaluating & predicting and asking further questions; communicating findings

Y3 Autumn	Y3 Spring	Y3 Summer
<p><b>Forces &amp; Magnets</b></p> <ul style="list-style-type: none"> <li>• Know what a force is and understand the effects of applying a force</li> <li>• Understand that there are different types of force</li> <li>• Describe two examples of force – push and pull</li> <li>• Explore how different surfaces result in different amounts of friction</li> <li>• Recognise that materials can be magnetic or non-magnetic</li> <li>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>• Understand that magnets have two poles – north and south</li> <li>• Observe how magnets attract or repel each other and attract some materials and not others</li> <li>• Predict whether two magnets will attract or repel each other, depending on which poles are facing</li> <li>• <b>CCE - Create a poster that explains the properties of magnetic and non-magnetic materials</b></li> </ul>	<p><b>Rocks</b></p> <ul style="list-style-type: none"> <li>• Name different rock types and their properties</li> <li>• Explore the different properties of rocks</li> <li>• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>• Recognise that soils are made from rocks and organic matter</li> <li>• Understand how different types of rocks are formed (the rock cycle)</li> <li>• <b>CCE - Create an interactive model or display that shows in simple terms how fossils are formed (rock forming around a former living thing)</b></li> </ul> <p><b>Light</b></p> <ul style="list-style-type: none"> <li>• Recognise that they need light in order to see things</li> <li>• Know that dark is the absence of light</li> <li>• Know that light travels in straight lines</li> <li>• Notice that light is reflected from surfaces</li> <li>• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• Recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>• Investigate patterns in the way that the size of shadows change</li> <li>• <b>CCE - Plan a shadow experiment and explain my findings (record observations and measurements and present data in different ways in order to answer a scientific question)</b></li> </ul>	<p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Name and describe the functions of different parts of flowering plants; roots, stem/trunk, leaves and flowers</li> <li>• Explore the conditions plants need for life and growth (air, light, water, nutrients from soil and room to grow) and how they can vary from plant to plant</li> <li>• Know the 7 life processes (MRS GREN)</li> <li>• Investigate the way in which water is transported within plants</li> <li>• Explore the part that flowers play in the life cycle of plants, including pollination, seed formation and seed dispersal</li> <li>• Investigate seed germination/plant growth (ask questions, systematic and careful observations over time, look for patterns, use evidence to answer questions and draw conclusions)</li> <li>• <b>CCE – Create a working model of a plant</b></li> </ul> <p><b>Animals Including Humans</b></p> <ul style="list-style-type: none"> <li>• Know that they cannot make their own food</li> <li>• Know that animals and humans get nutrition from what they eat</li> <li>• Investigate why animals including humans need the right types and amount of nutrition</li> <li>• Investigate how skeletons and muscles are used for support, protection and movement</li> <li>• Classify humans and some other animals (endoskeleton, exoskeleton and invertebrate)</li> <li>• <b>CCE - Research why certain foods are appropriate for particular types of animals (endoskeleton, exoskeleton and invertebrates)</b></li> </ul>

Respect

Responsibility

Reflection

Resilience

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Y4 Autumn	4 Spring	Y4 Summer
<p><b>Sound</b></p> <ul style="list-style-type: none"> <li>Identify how sounds are made, associating some of them with vibration</li> <li>Recognise that vibrations from sounds travel through a medium to the ear</li> <li>Find patterns between the pitch of the sound and the strength of the vibrations that produce it</li> <li>CCE – Build an effective ‘string telephone’</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>Recognise common appliances that run on electricity and understand electrical safety</li> <li>Learn about electrical components in a circuit</li> <li>Explore and recognise common conductors and insulators</li> <li>Construct simple series electrical circuit, identifying its basic parts, (cells, wires, bulbs, switches, buzzers)</li> <li>Make predictions about electrical circuits</li> <li>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</li> <li>Recognise that a switch opens and closes a circuit and predict if a lamp lights in a simple series circuit</li> <li>CCE Investigate how electrical components can change within a circuit and communicate findings using the correct scientific vocabulary</li> </ul>	<p><b>States of Matter</b></p> <ul style="list-style-type: none"> <li>Know the properties of a solid</li> <li>Know the properties of a liquid</li> <li>Know the properties of a gas</li> <li>Know the link between temperature and states of matter</li> <li>Understand what a comparative test is and why we use them</li> <li>Compare and group substances, according to whether they are solids, liquids or gasses</li> <li>Describe how substances can change shape</li> <li>Observe that some substances change state when they are heated or cooled, and measure or research the temperature at which this happens</li> <li>Explain the physical process involved within the water cycle (evaporation and condensation)</li> <li>CCE - Present their understanding of the water cycle, using the correct scientific vocabulary</li> </ul>	<p><b>Animals Including Humans (Teeth and Digestion)</b></p> <ul style="list-style-type: none"> <li>Identify different types of teeth and their functions</li> <li>Understand that teeth help digestion</li> <li>Understand different types of investigation</li> <li>Investigate how different substances can damage teeth</li> <li>Understand different parts of the digestive system and their functions</li> <li>Understand what a food chain is</li> <li>Recognise how endangered animals are affected by food chains</li> <li>Explain how food chains interlink</li> <li>CCE - Create a food chain model, identifying producers, predators and prey</li> </ul> <p><b>Living Things and their Habitats</b></p> <ul style="list-style-type: none"> <li>Know that living things can be grouped in a variety of ways</li> <li>Explore and use classification keys to help group and name a variety of living things in their local and wider environment</li> <li>Recognise that environments can change and that this can sometimes present danger to living things</li> <li>CCE – Use the school grounds to investigate how habitat affects living things</li> </ul>

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<p><b>The Solar System</b></p> <ul style="list-style-type: none"> <li>Describe the movement of the moon relative to the Earth</li> <li>Identify all the known planets in the Solar system and know the order from the sun</li> <li>Use scientific evidence to explain how we know that planets are approximately spherical bodies</li> <li>Describe the movement of the Earth and other planets, relative to the Sun in the solar system</li> <li>Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the Sun across the sky</li> <li>CCE – Contrast and compare a day in the life on Earth to that on other planets</li> </ul> <p><b>Forces</b></p> <ul style="list-style-type: none"> <li>Know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>Identify the effect of air resistance, water resistance and friction which acts between moving surfaces</li> <li>Investigate how some mechanisms, including levers, pulleys and gears allow a smaller force to have a greater effect</li> <li>Understand how gravity relates to Sir Isaac Newton’s Laws of Motion</li> <li>CCE - Plan an investigation to explore the effects of air or water resistance</li> </ul>	<p><b>Properties and Changes of Materials</b></p> <ul style="list-style-type: none"> <li>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> <li>Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution</li> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>Explain that some changes result in the formation of new materials, and that it is an irreversible change eg burning</li> <li>CCE - Debate ‘Has the production of new materials benefitted modern life?’ (Link to plastic pollution)</li> </ul>	<p><b>Living Things (plant and animals) and their Habitats</b></p> <ul style="list-style-type: none"> <li>Explore the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>Describe the life process of reproduction in some plants and animals</li> <li>Review the different parts of a flowering plant by dissecting a flower and identifying and explaining the function of each separate part</li> <li>Explain asexual and sexual reproduction in plants</li> <li>Understand the difference between pollination and fertilisation</li> <li>CCE – Investigate how the work of David Attenborough has increase our understanding of life on Earth</li> </ul> <p><b>Animals including humans</b></p> <ul style="list-style-type: none"> <li>Know the changes that the human body goes through during puberty</li> <li>Describe the changes as humans develop to old age</li> <li>Explain how puberty enables humans to reproduce (link to RSHE)</li> <li>CCE Demonstrate an understanding of the differences between the period of human infancy and that of other mammals</li> </ul>

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<p><b>Light</b></p> <ul style="list-style-type: none"> <li>• Know the difference between man-made and natural light sources</li> <li>• Recognise that light travels in straight lines</li> <li>• 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>• 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>• Understand the meaning of reflection and how reflection works scientifically</li> <li>• Understand what is meant by the term refraction</li> <li>• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> <li>• CCE - Explore the effect on light of different liquids (eg rainbows, soap bubbles, vegetables)</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• Associate the brightness of the lamp or the volume of the buzzer with the number and voltage of cells used in the circuit</li> <li>• Compare and give reasons for the variation in how components function eg the brightness of bulbs, loudness of buzzers and the on/off position of switches</li> <li>• Use recognised symbols when representing a simple circuit in a diagram</li> <li>• CCE - Create a circuit for a specific purpose (eg burglar alarm, traffic lights)</li> </ul>	<p><b>Animals Including Humans</b></p> <ul style="list-style-type: none"> <li>• Explain the function of blood and blood vessels</li> <li>• Explain the function of the heart and circulatory system</li> <li>• Understand the ways in which nutrients and water are transported in animals, including humans</li> <li>• Recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions</li> <li>• CCE - Design an investigation to explore the impact of exercise on the heart</li> </ul>	<p><b>Living Things and their Habitats</b></p> <ul style="list-style-type: none"> <li>• Know that living things (micro-organisms, plants and animals) are classified in to broad groups according to common observational characteristics, similarities and differences</li> <li>• Give reasons for classifying plants and animals based on specific characteristics</li> <li>• Describe helpful and harmful microorganisms</li> <li>• CCE - Use their understanding of the Linnaeus system to classify living things (familiar and unfamiliar)</li> </ul> <p><b>Evolution and Inheritance</b></p> <ul style="list-style-type: none"> <li>• Know what a fossil is and where they come from</li> <li>• Revise how a fossil is formed</li> <li>• Explore how features and characteristics can be inherited from parents and how some features are unique</li> <li>• Understand what is meant by the term selective breeding and the positives and negatives of its use</li> <li>• Understand what is meant by the term adaptation and appreciate its significance to living things</li> <li>• Investigate how living things have adapted to different climates and link to Darwin's theory</li> <li>• Know who Charles Darwin was and why his theory of evolution was so significant</li> <li>• CCE - Explain what is meant by the term extinction, why it can occur and present ideas about what can be done to stop it</li> </ul>

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## Working scientifically skills progression

Science	LKS2	UKS2
<b>Asking questions</b>	<ul style="list-style-type: none"> <li>Ask relevant questions and use different types of scientific enquiry to answer them</li> <li>Select appropriate resources and decide how to answer a scientific question</li> <li>Answer questions posed by the teacher</li> <li>Begin to recognise when secondary sources can be used answer questions that cannot be answered through practical work</li> </ul>	<ul style="list-style-type: none"> <li>Plan different types of scientific enquiry to answer questions, including recognising and controlling variables</li> <li>Ask scientific questions and ask further questions based on a developed understanding following and investigation / enquiry</li> <li>Select appropriate resources and decide how to answer a scientific question, choosing the type of enquiry and justifying choices</li> <li>Recognise when secondary sources can be used answer questions that cannot be answered through practical work</li> </ul>
<b>Making observations and taking measurements</b>	<ul style="list-style-type: none"> <li>Make systematic and careful observations</li> <li>Use a range of equipment and standard units for measuring length, time, temperature and capacity</li> </ul>	<ul style="list-style-type: none"> <li>Select measuring equipment to give the most precise results</li> <li>Make decisions during a scientific enquiry eg repeating readings (fair testing); increasing sample size; adjusting observation period and frequency; checking secondary source (researching)</li> </ul>
<b>Practical enquiry to answer questions</b>	<ul style="list-style-type: none"> <li>Set up simple practical enquiries, comparative and fair tests</li> <li>Select from a range of resources to gather evidence to answer questions generated by the teacher or themselves</li> <li>Follow a plan to carry out: observations &amp; tests; comparative and simple fair tests; observations over time; pattern seeking</li> </ul>	<ul style="list-style-type: none"> <li>Plan different types of scientific enquiries, including selecting from a range of practical resources to gather evidence to answer their questions, carrying out a fair test and recognising and controlling variables where necessary</li> <li>Make decision about what observations or measurements to make over time and for how long</li> <li>Look for patterns and relationships using a suitable sample</li> </ul>
<b>Recording and presenting evidence</b>	<ul style="list-style-type: none"> <li>Begin to decide how to record and present evidence using simple scientific language</li> <li>Begin to present data in different ways in order to help with answering a question (eg drawings, labelled diagrams, keys, bar charts, tables)</li> </ul>	<ul style="list-style-type: none"> <li>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>Present the same data in different ways in order to help with answering a scientific question</li> </ul>

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	LKS2	UKS2
<b>Forming conclusions and answering questions</b>	<ul style="list-style-type: none"> <li>• Use results to draw simple conclusions based on evidence and current subject knowledge</li> <li>• Answer own and others' questions based on straightforward scientific evidence and observations they have made (measurements or information gained from secondary sources)</li> <li>• Interpret data to generate simple comparative statements based on their evidence</li> <li>• Begin to identify naturally occurring patterns and causal relationships</li> </ul>	<ul style="list-style-type: none"> <li>• Draw conclusions that identify causal relationships and patterns from their evidence</li> <li>• Identify results that do not fit the overall pattern and explain their findings using subject knowledge</li> <li>• Report and present findings from enquiries in oral and written forms, using appropriate scientific vocabulary</li> <li>• Answer scientific questions based on observations, measurements of information from secondary sources</li> <li>• Discuss if other evidence (other groups, secondary sources) support or contradict/refute their answers</li> <li>• Explore how their scientific ideas change due to new evidence they gather</li> <li>• Appreciate and discuss how new discoveries change scientific understanding</li> </ul>
<b>Evaluating and raising further questions and predictions</b>	<ul style="list-style-type: none"> <li>• Use results to draw simple conclusions, suggesting improvements and raising further questions</li> <li>• Identify ways they can adapt methods and how they would do things differently if they repeated the enquiry</li> <li>• Use a scientific experience to ask further questions that could be answered by extending / improving the same enquiry</li> </ul>	<ul style="list-style-type: none"> <li>• Report and present finding from scientific enquiries in oral and written forms, including conclusions, causal relationships and explanations of and degree of trust in results</li> <li>• Evaluate the choice of method, the control variables, the precision and accuracy of measurements and the credibility of secondary sources</li> <li>• Identify any limitations that reduce the trust they have in their data</li> <li>• Use scientific knowledge and test results to make predictions that they could investigate using comparative and fair tests</li> </ul>
<b>Communicating findings</b>	<ul style="list-style-type: none"> <li>• Communicate (oral and written) their finding using appropriate scientific vocabulary</li> </ul>	<ul style="list-style-type: none"> <li>• Communicate (oral and written) their findings using relevant and more advanced scientific language and illustrations</li> </ul>

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