








Whole School Progression of Skills (Working Scientifically)

Science – Learning all about the world around us. We observe, describe and experiment to find out facts about the universe.








Working Scientifically					
Enquiry Approaches	Observing over time (Adventurer dog) 	Identify and Classify (Explorer dog) 	Pattern Seeking (Detective dog) 	Research (Globetrotter dog) 	Comparative/Fair testing (Judge dog) 
Foundation stage	<i>Children will ask questions about the environment including the weather outside. They will be able to suggest what they might wear. They will develop an understanding of growth, decay and changes over time and show care and concern for living things and the environment. They will use their senses when walking around and investigating. They will develop questioning and curiosity through play and understand the concept of forces and electricity through twisting, pushing, slotting and magnetic toys and seeing the effects of pushing different buttons to make sounds and movements. They can talk about similarities and differences between living things and materials and make simple observations about animals.</i>				
Nursery	<p>Encouraging scientific enquiry How does the ... change over time? How does a baby change over time? Research using secondary sources Find out about the human life-cycle from an expectant mother, parent with a baby and elderly person. How does a plant change as it grows? What happens to fruit, vegetables and flowers when left over time? Researching using secondary sources How does the cake mixture change? How does chocolate change when heated? How does fruit juice change when put in the freezer? How does fruit change when blended?</p>	<p>Encouraging scientific enquiry Sort images of humans according to their age. Sort using different senses. Which do you like/not like? Find and identify natural objects to include in the collection. Which natural objects are from plants, animals or neither? Sort materials using simple properties. Which materials are reflective to use for an outside mobile? Which fabrics are reflective to help us be seen at night? Which materials block light to help us protect ourselves from the Sun? Sort objects according to whether they float or sink. Sort objects/materials according to whether their shape can be changed.</p>		<p>Encouraging scientific enquiry Find out more about the life cycles of the animals observed. Classification Match animals and their young. Look at seed and bulb packets to learn how to plant and care for them.</p>	<p>Encouraging scientific enquiry Compare how quickly different seeds/bulbs germinate. Compare how different vegetable tops grow. Compare how bright different light sources are. Compare how reflective different materials are. Compare the path of different wind-up toys. Compare how far different wind-up toys move. Compare the speed and direction of gears. Compare how easy or hard it is to lift an object with or without a pulley. Compare how easy it is to ride a scooter or bike on different surfaces. Compare the sound produced by shakers made with different materials. Compare the sound produced by different drums. Compare the sound produced by different elastic bands on their 'guitar'.</p>
Reception	<p>Encouraging scientific enquiry How does a puddle change over time? How does a snowman change as it melts? How does the natural world change with the seasons? How does the block of ice change over time? How does a snowman change over time?</p>	<p>Encouraging scientific enquiry Sort animals according to where they live. Sort images of people according to their characteristics. Researching using secondary sources Name and describe plants and animals they find in the school grounds. Which clothes are suitable for each</p>	<p>Encouraging scientific enquiry Look for minibeasts in different areas of the school grounds. Look for plants in different areas of the school grounds. Find simple patterns in how light levels and temperature change with the movement, or obscuring of, the Sun</p>	<p>Encouraging scientific enquiry Learn how animals from a different habitat are cared for. Learn about animals in a different habitat. Find out information from visitors (dentist, nurse etc.). Are taller children faster? Are taller children stronger?</p>	<p>Encouraging scientific enquiry How does popcorn made in a microwave compare to popcorn made on a fire? How quickly do ice cubes melt in different areas of the playground? How are pizza bases different when made with different flours? How does a loaf cook differently in different tins?</p>

	<p>How does cake mixture/bread dough change as it is cooked?</p> <p>How do the Sun and shade change during the day?</p> <p>How does a toy's shadow change during the day?</p> <p>Listen to the siren of an emergency vehicle as it approaches and moves away.</p>	<p>season?</p> <p>Which objects/materials make dark shadows?</p>		<p>Find out about how animals behave in different seasons.</p> <p>Find out about the weather and seasons.</p> <p>Find out about shadows.</p> <p>Find out about rainbows.</p> <p>Find out about nocturnal animals.</p>	<p>How do cupcakes cook if they have different amounts of mixture?</p> <p>Compare the shape of shadows made by different objects.</p> <p>How many cubes/small plastic animals can fit in different 'boats'?</p> <p>Compare how cars move down ramps/gutters.</p> <p>Compare how wheels turn when sand or water is poured through.</p> <p>Compare how objects fall.</p> <p>Compare how objects fall with and without parachutes.</p> <p>Compare how different balls bounce.</p> <p>Compare how things move when blown.</p> <p>Compare how a marble moves through different liquids.</p> <p>Compare how different paper aeroplanes fly.</p> <p>How does rain sound different when it lands in different containers?</p> <p>Make and testing air-propelled rockets to find out which is the 'best'.</p>
Year 1	<p>Children will be asking questions about the local environment including plants and animals found there including how they can look after them. They will observe and talk about the weather and changes. They will explore different materials using scientific language to describe them.</p>				
Year 1	<p>Measure time in seconds, minutes, hours, days.</p> <p>Record observations as scientific drawings and labelled features.</p> <p>Use magnifying glasses to label scientific drawings.</p> <p>Examples of 'big questions' that can be explored by observing over time.</p> <ul style="list-style-type: none"> How does a daffodil bulb change over the year? How does a sunflower change each week? How does an oak tree change over the year? How does my height change over the year? What happens to materials over time if we bury them in the ground? What happens to shaving foam over time? 	<p>Use simple equipment to observe closely.</p> <p>Make observations and measurements to look for similarities and differences.</p> <p>Organise into groups and make connections.</p> <p>Classify using simple prepared tables and sorting rings.</p> <p>Explore the world around them. Make careful observations to support identification, comparison and noticing change.</p> <p>Use magnifying glasses and digital microscope to observe closely.</p> <p>Examples of 'big questions' that can be explored by identifying and classifying.</p> <ul style="list-style-type: none"> How can we sort the leaves that we collected on our walk? How can we organise all the zoo animals? 	<p>Describe patterns orally.</p> <p>Begin to take measurements, initially by comparisons, then using non-standard units.</p> <p>Record observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</p> <p>Recognise 'biggest and smallest', 'best and worst' etc. from data.</p> <p>Use a timer to measure time.</p> <p>Examples of 'big questions' by identifying patterns in measurements and observations recorded.</p> <ul style="list-style-type: none"> Do trees with bigger leaves lose their leaves first in autumn? Is there a pattern in where we find moss growing in the school grounds? Do you get better at smelling as you get older? Does the wind always blow 	<p>Ask simple questions and recognise that they can be answered in different ways.</p> <p>Answer questions developed with the teacher often through a scenario.</p> <p>Present research findings as a group/class.</p> <p>Examples of 'big questions' that can be explored through research.</p> <ul style="list-style-type: none"> What are the most common British plants and where can we find them? How are animals in Australia different to the ones that we find in Britain? Do all animals have the same senses as humans? Are there plants that are in flower every season? What are they? How are bricks made? What materials can be recycled? 	<p>Perform simple tests.</p> <p>Compare different cases/situations.</p> <p>Measure and collect data.</p> <p>Examples of 'big questions' that can be explored through comparative tests.</p> <ul style="list-style-type: none"> Which type of compost grows the tallest sunflower? Which tree has the biggest leaves? Is our sense of smell better when we can't see? In which season does it rain the most? Which materials are the most flexible? Which materials are the most absorbent?

		<ul style="list-style-type: none"> • What are the names for all the parts of our bodies? • How would you group these things based on which season you are most likely to see them in? • We need to choose a material to make an umbrella. Which material is waterproof? • Which materials will float and which will sink? 	<p>the same way?</p> <ul style="list-style-type: none"> • Is there a pattern in the types of materials that are used to make objects in a school? 		
Year 2	<p>Children will be asking questions about the local environment including discussing how plants grow, survive, germinate and reproduce. They investigate different habitats (incl. micro) and observe how different animals depend on each other and its life processes. They understand basic needs of animal survival including exercise and nutrition. They can identify properties of materials and state why they are suited to purpose. They can name some scientists who have developed new materials.</p>				
Year 2	<p>Use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make observations.</p> <p>Measure time in seconds, minutes, hours, days and also measure a variety of variables that are observed, such as, temperature, light levels and sound levels.</p> <p>Record observations using scientific drawings and tables.</p> <p>Use microscopes to label scientific drawings.</p> <p>Examples of 'big questions' that can be explored by observing over time.</p> <ul style="list-style-type: none"> • What happens to a bean after it is planted? • How does a tadpole change over time? • How much food and drink do I have over a week? • How long do bubble bath bubbles last for? • Would a paper boat float forever? 	<p>Talk about similarities and differences backed up by discussions about observations and measurements.</p> <p>Use observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.</p> <p>Use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</p> <p>Use digital microscope and microscopes to observe closely.</p> <p>Examples of 'big questions' that can be explored by identifying and classifying.</p> <ul style="list-style-type: none"> • How can we identify the trees that we observed on our tree hunt? • Which offspring belongs to which animal? • How would you group these plants and animals based on what habitat you would put them in? • How would you group things to show which are living, dead, or have never been alive? • Which materials are shiny and which are dull? 	<p>Use observations and ideas to suggest answers to questions noticing similarities, differences and patterns.</p> <p>Describe patterns in written work.</p> <p>Take measurements and record using standard units to compare.</p> <p>Record measurements e.g. using prepared tables, pictograms, tally charts and block graphs.</p> <p>Talk about cause and effect relationships.</p> <p>Use a stopwatch to measure time.</p> <p>Examples of 'big questions' by identifying patterns in measurements and observations recorded.</p> <ul style="list-style-type: none"> • Do bigger seeds grow into bigger plants? • What conditions do woodlice prefer to live in? • Which age group of children wash their hands the most in a day? • Which habitat do worms prefer – Where can we find the most worms? 	<p>Ask simple questions and recognise that they can be answered in different ways including use of scientific language.</p> <p>While exploring the world, develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.</p> <p>Plan how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.</p> <p>Use experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.</p> <p>Use research tools such as questionnaires and interviews to collect data.</p> <p>Read for information and note down key facts.</p> <p>Examples of 'big questions' that can be explored through research.</p> <ul style="list-style-type: none"> • How does a cactus survive in 	<p>Compare different cases/situations.</p> <p>Measure and collect data.</p> <p>Use tally charts to record observations.</p> <p>Examples of 'big questions' that can be explored through comparative tests.</p> <ul style="list-style-type: none"> • Do cress seeds grow quicker inside or outside? • Do amphibians have more in common with reptiles or fish? • Do bananas make us run faster? • Is there the same level of light in the evergreen wood compared with the deciduous wood? • Which shapes make the strongest paper bridge? • Which materials would be best for the roof of the little pig's house?

- a desert with no water?
- What do you need to do to look after a pet dog/cat/lizard and keep it healthy?
- What food do you need in a healthy diet and why?
- How does the habitat of the Arctic compare with the habitat of the rainforest?
- How have the materials we use changed over time?
- How are plastics made?

Working Scientifically

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Enquiry Skills	Asking questions	Making predictions	Setting up tests	Observing and measuring	Recording data	Interpreting and communicating results	Evaluating
							
Nursery	Shows curiosity about objects, events and people.	Shows curiosity about objects, events and people. Questions why things happen.	Find ways to solve problems/find new ways to do things. Take risks through trial and error. Engage in open ended activities.	Explore the natural world making observations Observe and describe what they see using everyday language. Take measurements initially by comparisons.	Draw pictures of objects in their own environment. Can order items. Can sort in more than 2 groups using familiar categories.	Develop own narrative and explain by connecting ideas or events. Develop vocabulary which meets the breadth of their experiences.	Develop own narrative and explanations by connecting ideas or events. Talk about what I have found and say what worked well.
Reception	Questions why things happen. Asks questions to clarify understanding and aspects of their familiar world e.g. place they live or natural world.	Shows curiosity about objects, events and people. Questions why things happen.	Find ways to solve problems/find new ways to do things. Test out ideas. Take risks through trial and error. Engage in open ended activities. Choose the resources they need for their chosen activity from their environment.	Explore the natural world making observations (e.g seasons) Explore different equipment and finding out what its uses are. Know similarities and differences between the natural world around them. Begin to use non-standard units. Make links and notice patterns in their experiences.	Can take photos of things of interest to them. Can count results. Start to mark make to record results. Can create a class chart using pictures and objects.	Offer explanations for why things happen- making use of some recently introduced scientific vocabulary. Develop vocabulary which meets the breadth of their experiences.	Describe how things work in simple terms and make basic alterations and suggest things that did not work (e.g. this button does not work so press this one) Questions why things happen. Children will come up with alternative ways of doing this through exploration. Children can say or indicate by smiley faces/scale if they have achieved the learning objective.
Year 1	Explore the world around them and raise own questions. (e.g growing, animals in their habitat, everyday materials.)	Can make basic predictions over things they can see or their own ideas. Can use some scientific vocabulary.	Begin to recognise different ways they may answer scientific questions. Experience different types of enquiry including practical activities.	Uses appropriate senses aided by equipment such as magnifying glasses and digital microscopes to make observations. With help and prompting,	Begin to show accuracy in drawings and simple labels. Use key scientific vocabulary provided by the teacher. Can complete a simple	Can use evidence from simple tests when answering questions. With help begin to notice patterns and relationships. Talk about what they have	With scaffolding and prompting can suggest improvements to their enquiries. Talk about some changes that could be made.

	<p>Can answer questions supported by the teacher, often through scenarios and recognise questions can be answered in different ways.</p> <p>Can begin to ask simple questions and use simple secondary sources to find answers. Able to ask yes and no questions to sort and classify</p>		<p>Use practical resources provided by the teacher and can suggest some resources of their own.</p> <p>Can carry out simple tests to classify, compare or pattern seek.</p>	<p>observe changes over time and can describe the changes.</p> <p>Can identify and group, compare and contrast using observations, video and photographs.</p> <p>Use discrete e.g., counting and continuous data e.g. liquid to manageable common standard units.</p> <p>Can use simple measurements and equipment such as hand lenses and egg timers to gather data.</p> <p>Can use non-standard measures to compare.</p>	<p>table of results. (Prepared)</p> <p>Can add marks to a chart to collect data.</p> <p>Can using sorting rings to classify in more than 2 groups answering yes or no questions.</p> <p>Can sort using a simple 2 criteria Venn diagram.</p> <p>Can complete a prepared block graph/pictogram.</p>	<p>found out and how they found it out.</p> <p>Can make comparisons and recognise biggest/smallest, most effective/least effective from data.</p>	<p>Use simple success ladders to evaluate their tests or understanding against the learning objective.</p>
Year 2	<p>Raise questions that help them become familiar with scientific processes (e.g life processes that are common to all living things, their local environment, materials)</p> <p>Can ask simple questions relevant to the topic.</p> <p>Can use a range of question stems. (e.g. Is a flame alive? Is a deciduous tree dead in winter? What makes the best habitat for a minibeast? Where in the school can we find something that is made of wood? Which animal belongs to which offspring? Do seeds grow quicker inside or out?)</p> <p>Know their questions can be answered in different ways.</p> <p>Use more than one secondary source to gather and present information clearly.</p>	<p>Draws on knowledge from observations to make a prediction.</p> <p>Can begin to test predictions and later answer questions (predictions can be a guess).</p> <p>Ask questions about what might happen in the future.</p>	<p>Carry out simple comparative tests using own ideas (May use Discovery Dog model)</p> <p>Experience different types of enquiry including practical activities.</p> <p>Within the planning frame can suggest resources they may need for the test.</p> <p>Can carry out simple tests linked to the types of enquiry: observation, testing, pattern seeking, identifying and classifying and research.</p>	<p>Observe closely, using simple equipment.</p> <p>Can identify a variety of plants and animals using observations.</p> <p>Observe how different plants grow and record findings including similar plants at different stages of growth and notice similarities and differences.</p> <p>Use their observations and ideas to suggest answers to questions.</p> <p>Observe through video, first-hand observations and measurement how different animals including humans grow and offer explanations.</p> <p>Compare objects based on observable features.</p> <p>Use standard units to estimate and measure length, height, temperature, and capacity.</p> <p>Can use rulers, scales, thermometers and measuring vessels with some degree of accuracy.</p> <p>Make decisions about what measurements to use and how long to make them for.</p>	<p>The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</p> <p>Record findings using scientific language.</p> <p>Gather and record data to help in answering questions.</p> <p>Count results using a tally chart.</p> <p>Use prepared tables to record results.</p> <p>Can identify and classify.</p> <p>Use simple keys based and yes or no questions.</p> <p>Can sort into 2 groups explaining their reasons clearly.</p> <p>Can record using prepared vertical bar charts.</p> <p>Can use results from tally charts.</p>	<p>Communicate findings to an audience using relevant scientific language and illustrations.</p> <p>Can identify casual relationships and patterns in results.</p> <p>Can identify which results do not fit the overall pattern and explain findings.</p> <p>Refers to the table of results when describing what has happened.</p> <p>Draws a basic conclusion (with support from the teacher) using own scientific knowledge, observations and comparisons.</p> <p>Uses results of investigations to answer enquiry questions.</p>	<p>With support can suggest improvements to their enquiries.</p> <p>Suggest some things that could be changed and evaluate why things went wrong.</p> <p>Use success ladders with multiple criteria to evaluate the test or their understanding against the learning objective.</p>

Working Scientifically Vocabulary

Nursery	look closely, watch, touch, ask questions,
Reception	Observe, feel, smell, listen, same, different, compare, record, sort, group
Year 1	observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, drawing, picture, table, pictogram, Venn diagram, ask questions, test, investigate, explore, equipment, magnifying glass, metre stick, spoon, teaspoon, answer questions, comparative testing, observing over time, classifying
Year 2	data, record results, tally chart, present, block chart, resources, hand lens, ruler, tape measure, pipette, syringe, interpret results, scientific enquiry, pattern seeking, researching using secondary sources