

## Working Scientifically Skills

| Plan                        |   | DO  |  |  | Review  |  |  |
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|                             | Recognise the best type of enquiry to answer a question   | Choose equipment, select tests, use secondary sources to decide how to obtain accurate observations and measurements  | Obtain observations and measurements using equipment and/or secondary sources  | Record observations and measurements   | Draw conclusions and make explanations  | Evaluate the data collected  | Evaluate the process used (including next steps) |
| <b>EYFS ELG's</b>           | Make comments about what they have heard and ask questions to clarify their understanding. (Listening, Attention and Understanding)   | Engage in open-ended activity Playing & Exploring<br><br>Work and play cooperatively and take turns with others.(Building Relationships<br><br>Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. (managing self)  | Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate. (Self-Regulation)<br><br>Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. (Creating with Materials)                                   | Explore the natural world around them, making observations and drawing pictures of animals and plants. (The Natural World)<br><br>Begin to show accuracy and care when drawing (Physical Development: Fine Motor Skills)                       | Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. (The Natural World)<br><br>Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate (Speaking)  | Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class (The Natural World)  |  |
| <b>EYFS Curricular Aims</b> | <b>Nursery:</b> Talk about my immediate family and experiences that I have had chatting in everyday play and focused sessions, showing the ability to concentrate, think through and extend ideas and real and imaginary thoughts with others.<br><br><b>Reception:</b> Share own knowledge and ask questions of others to find out more. Ask relevant questions and make comments, chat back and forth with friends and adults and express ideas and feelings with confidence. | <b>Nursery:</b> Greet and interact with friends, sharing thoughts and resources patiently: valuing self and others and be willing to persist and not be daunted by failure.<br><br><b>Reception:</b> Have the confidence to persevere even when something is difficult.<br><br>Show determination and resilience when learning something new. | <b>Nursery:</b> Greet and interact with friends, sharing thoughts and resources patiently: valuing self and others and be willing to persist and not be daunted by failure.<br><br><b>Reception:</b> Play a game with others and show empathy, determination to complete a goal, resilience in the face of challenges and show curiosity about the world | <b>Nursery:</b> Talk about my immediate family and experiences that I have had chatting in everyday play and focused sessions, showing the ability to concentrate, think through and extend ideas and real and imaginary thoughts with others. | <b>Nursery:</b> Talk about my immediate family and experiences that I have had chatting in everyday play and focused sessions, showing the ability to concentrate, think through and extend ideas and real and imaginary thoughts with others.<br><br><b>Reception:</b> Share own knowledge and ask questions of others to find out more. Ask relevant questions and make comments, chat back and forth with friends and adults and express ideas and feelings with confidence. | <b>Nursery:</b> Talk about my immediate family and experiences that I have had chatting in everyday play and focused sessions, showing the ability to concentrate, think through and extend ideas and real and imaginary thoughts with others.<br><br><b>Reception:</b> Appreciate some similarities and differences between, lives, cultures and religions, both where I live and around the world. |  |
| <b>Year 1</b>               | <i>With help and encouragement I ask simple questions that begin with why, what if, how or when.</i><br><br>The children answer questions developed with the teacher often through a scenario.  |   | <i>With help, I use simple equipment.e.g. magnifying glasses and non-standard units to find things out. I observe using my senses.</i><br><br>They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.   | <i>With help, I can gather and record data to help me answer my questions.</i><br><br>The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.  |   | <i>I talk about what happened and/or what I saw.</i><br><br>The children recognise 'biggest and smallest', 'best and worst' etc. from their data.  |  |

Progression in Working Scientifically Skills

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| <p><b>Year 2</b></p> | <p>I ask simple questions and recognise these questions can be answered in different ways.</p>   |   | <p>I observe closely, using simple equipment <i>and begin to measure using non-standard units.</i><br/> <b>I can identify and classify.</b><br/>         Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.<br/> <b>I can perform a simple test.</b></p> | <p>I gather data and record data to help me answer my questions.</p>  |  | <p>I use my observations and ideas to suggest answers to my questions.</p>   |  |
| <p><b>Year 3</b></p> | <p><i>I can ask questions.</i></p> <p><i>I recognise that there are different types of enquiry.</i></p> <p>The children answer questions posed by the teacher.</p> <p>The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.</p> | <p><i>I can set up a simple practical enquiry and I am beginning to understand how to make a test fair. I make suggestions about what observations and measurements to make and what equipment I need.</i></p>  | <p><i>I am beginning to make systematic and careful observations. I sometimes use standard units.</i></p> <p><i>With help I can use information sources provided to find things out.</i></p>   | <p><i>I gather data and using a pre-prepared table I can record data.</i></p> <p><i>I record my findings using a drawing and/or words.</i></p>  | <p><i>With help, I can present my data.</i></p> <p>Children interpret their data to generate simple comparative statements based on their evidence.</p>  | <p><i>I can use my results when I talk about what happened. I can talk about my findings to an audience using appropriate scientific vocabulary.</i></p>   | <p><i>I can talk about what went wrong!</i></p> <p><i>I have ideas about what else I would like to find out.</i></p>   |
| <p><b>Year 4</b></p> | <p>I ask relevant questions and use different types of scientific enquiries to answer them. <i>Given a range of resources, the children decide for themselves how to gather evidence to answer the question.</i></p>   | <p><b>I can set up simple practical enquiries, comparative or fair tests.</b><br/>         A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.</p> <p>A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.</p> | <p><b>I use a range of equipment (including thermometers and dataloggers).</b></p> <p><b>I make systematic and careful observations and take accurate measurements using standard units.</b></p>   | <p><b>I gather, record and classify data in a variety of ways to help me answer my questions.</b></p> <p><b>I record my findings using simple scientific language, tables, drawings and labelled diagrams, bar charts and tables.</b></p> | <p><b>I present my data in a variety of ways <i>using e.g. Venn diagrams, bar charts, simple scatter graphs and keys.</i></b></p> <p><b>Identifying differences, similarities or changes related to simple scientific ideas and processes.</b></p> | <p><b>I use my results to draw simple conclusions I make predictions for new values.</b></p> <p><b>I using straightforward scientific evidence to answer questions or to support their findings.</b></p> <p><b>I report my findings using oral and written explanations, displays or presentations of results and conclusions.</b></p> | <p><b>I suggest improvements to the way I carried out the enquiry. I suggest further questions to investigate.</b></p> |
| <p><b>Year 5</b></p> | <p>Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further</p>  | <p>Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question.</p>   | <p><i>I use a range of equipment independently. The series of observations and measurements I take are adequate for the task.</i></p>  | <p><i>I gather and record non-complex results (data and observations) using e.g. tables and scientific diagrams.</i></p>  | <p><i>I present the results (data and observations) in a range of formats</i></p>  | <p><i>I draw conclusions from my data and observations.</i></p>  | <p>I use what I have found out to suggest improvements to my work giving reasons.</p>                                  |

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|               | <p>questions based on their developed understanding following an enquiry.</p>  | <p>They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.</p> | <p><i>I use information sources provided to find things out. I identify possible risks to myself and others.</i></p>  |   | <p><i>e.g. bar and line graphs, simple scatter graphs, keys and frequency charts.</i></p>   | <p>They talk about how their scientific ideas change due to new evidence that they have gathered.</p> <p>They talk about how new discoveries change scientific understanding.</p>  | <p>I can set up further questions to investigate.</p>   |
| <b>Year 6</b> |  | <p>I can plan different types of science enquiries to answer questions.</p> <p>I recognise and control variables where necessary.</p>  | <p>I take measurements, using a range of scientific equipment with increasing accuracy and precision.</p> <p>I take repeat readings when appropriate.</p>   | <p>I record data and results of increasing complexity using e.g. scientific diagrams and labels classification keys, tables, scatter graphs, bar and line graphs.</p>   |   | <p>Reporting and presenting 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.</p> <p>I identify scientific evidence to support or refute the ideas or arguments for my conclusion.</p>  | <p>I use my test results to make predictions to set up further enquiries e.g. comparative and fair tests and suggest how my working methods could be improved, with reasons.</p>  |
| <b>KS3</b>    | <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p> | <p>Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate</p>  | <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety</p> <p>Make observations and measurements using a range of methods for different investigations</p> | <p>record observations and measurements using a range of methods for different investigations</p> <p>Apply sampling techniques Apply mathematical concepts and calculate results Use and derive simple equations and carry out appropriate calculations Undertake basic data analysis including simple statistical techniques</p> | <p>Present observations and data using appropriate methods, including tables and graphs</p> <p>Present reasoned explanations, including explaining data in relation to predictions and hypotheses</p> | <p>Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review</p> <p>Evaluate risks Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility.</p> <p>Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</p> <p>Make predictions using scientific knowledge and understanding</p> | <p>Evaluate the reliability of methods and suggest possible improvements</p> <p>Evaluate data, showing awareness of potential sources of random and systematic error</p> <p>Identify further questions arising from their results</p> |