

# MILLBROOK COMMUNITY PRIMARY SCHOOL

# Science

## WORKING SCIENTIFICALLY - SKILLS PROGRESSION

The National Curriculum defines *Working Scientifically* as the understanding of the **nature, process and methods** of Science. Many terms are used as alternatives to Working Scientifically including scientific enquiries and investigations since we want the children to work scientifically through raising and then answering their own questions. The questions that children raise cannot all be answered in the same way so there are a number of **Types of Enquiry** that enable to work in different ways to find answers.

### TYPES OF ENQUIRY

- [Comparative & Fair Testing](#)
- [Identifying & Classifying](#)
- [Observing Over Time](#)
- [Pattern Seeking](#)
- [Research Using Secondary Sources](#)

## OBSERVING OVER TIME

|                            | <b>PLAN</b>   | <b>DO</b>   | <b>REVIEW</b>  |
|----------------------------|---|---|--|
| <b>EYFS</b>                | <ul style="list-style-type: none"> <li>I am curious about things that change</li> <li>With help I ask questions</li> <li>I talk about my ideas for finding out how things change</li> </ul>   | <ul style="list-style-type: none"> <li>I use all my senses to observe change</li> <li>I look closely at how things change</li> <li>I make simple records of how things change <i>(with help when necessary)</i></li> </ul>  | <ul style="list-style-type: none"> <li>I talk about what I have done and what I have noticed</li> </ul>  |
| <b>KEY STAGE ONE</b>       | <ul style="list-style-type: none"> <li>I ask questions about how and why things change</li> <li>With help, I identify changes to observe and measure and suggest how to do it</li> </ul>  | <ul style="list-style-type: none"> <li>I use non-standard units and simple equipment to record changes</li> <li>I record in words, pictures, simple prepared tables and charts</li> </ul>   | <ul style="list-style-type: none"> <li>I identify simple changes and talk about them</li> <li>I can sequence changes</li> <li>I begin to use scientific language to talk about changes</li> <li>I talk about whether the change was what I expected</li> </ul>   |
| <b>LOWER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>I talk about things changing and decide when questions can be answered by observing over time</li> <li>I decide what observations to make, how often and what equipment to use.</li> </ul>                                 | <ul style="list-style-type: none"> <li>I use a range of equipment to collect data using standard measures</li> <li>I make records using table and bar charts</li> <li>I begin to use and interpret graphs produced by dataloggers</li> </ul>  | <ul style="list-style-type: none"> <li>I draw simple conclusions from the changes I observed</li> <li>I talk about changes using some scientific language</li> <li>I suggest improvements to the ways I observe</li> </ul>   |
| <b>UPPER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>I decide when observing changes over time will help to answer my questions</li> <li>I decide how detailed my observations need to be, and what equipment to use to make my measurements as accurate as possible</li> </ul> | <ul style="list-style-type: none"> <li>I use equipment accurately without support</li> <li>I record data appropriately</li> <li>I present data in line graphs</li> <li>I interpret changes in data</li> <li>I recognise the effect of changing the time and number of observations</li> </ul> | <ul style="list-style-type: none"> <li>I draw valid conclusions from data about changes</li> <li>I recognise the significance of things changing over time</li> <li>I talk about and explain changes using scientific knowledge &amp; understanding</li> <li>I evaluate how well I observed over time</li> </ul> |

## IDENTIFYING AND CLASSIFYING

|                            | <b>PLAN</b>   | <b>DO</b>   | <b>REVIEW</b>  |
|----------------------------|---|---|--|
| <b>EYFS</b>                | <ul style="list-style-type: none"> <li>I am curious about similarities and differences</li> <li>With help I ask questions about similarities and differences</li> <li>I talk about my ideas for sorting and matching things</li> </ul>  | <ul style="list-style-type: none"> <li>I use my senses to sort and match things</li> <li>I match things that are the same</li> <li>I find things that are similar or different</li> <li>I sort or group things in my own way</li> <li>I use simple equipment to help me sort things (<i>eg: hoops/boxes</i>)</li> </ul>   | <ul style="list-style-type: none"> <li>I talk about how I sorted or matched things</li> </ul>  |
| <b>KEY STAGE ONE</b>       | <ul style="list-style-type: none"> <li>I ask questions about how and why things are similar or different</li> <li>I decide what to observe to identify or sort things</li> </ul>  | <ul style="list-style-type: none"> <li>I make comparisons between simple features of objects, materials or living things</li> <li>I record my observations in words, pictures or simple tables</li> <li>I sort objects by observable and behavioural features</li> <li>I record my sorting in sorting circles</li> </ul>  | <ul style="list-style-type: none"> <li>I identify similarities &amp; differences &amp; talk about them</li> <li>I begin to use simple scientific language to talk about how things are similar or different</li> <li>I try to use my records to help sort or identify other things</li> </ul>            |
| <b>LOWER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>I talk about what criteria I will use to sort and classify things</li> <li>I decide what equipment to use to identify and classify things</li> <li>I talk about things that can be grouped and decide when questions can be answered by sorting and classifying</li> </ul> | <ul style="list-style-type: none"> <li>I carry out simple tests to sort and classify according to properties or behavior</li> <li>I use Carroll diagrams, Venn diagrams &amp; more complex tables to sort things</li> <li>I use simple keys and branching databases to identify things</li> <li>I make simple branching databases (<i>keys</i>) for things that have clear differences</li> </ul> | <ul style="list-style-type: none"> <li>I draw simple conclusions about the things I have sorted and classified</li> <li>I talk about the similarities &amp; differences I identified using some scientific language</li> <li>I suggest improvements to the way I sort &amp; identify things</li> </ul>   |
| <b>UPPER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>I recognise when identifying &amp; classifying will be helpful to my answer my questions</li> <li>I decide what equipment, tests &amp; secondary sources of information to use to identify &amp; classify things</li> </ul>  | <ul style="list-style-type: none"> <li>I use a series of tests to sort &amp; classify materials</li> <li>I use secondary sources to identify &amp; classify things</li> <li>I make my own keys &amp; branching databases with 4 or more items</li> </ul>  | <ul style="list-style-type: none"> <li>I draw valid conclusions when sorting &amp; classifying</li> <li>I recognise the significance of sorting &amp; classifying</li> <li>I talk about &amp; explain what I have done using scientific knowledge</li> <li>I evaluate how well my keys worked</li> </ul> |

- I use more than one piece of scientific evidence to identify & classify things

## PATTERN SEEKING

|                            | <b>PLAN</b>   | <b>DO</b>  | <b>REVIEW</b>   |
|----------------------------|---|--|---|
| <b>EYFS</b>                | <ul style="list-style-type: none"> <li>• I am curious about patterns</li> <li>• With help, I ask questions about patterns</li> <li>• I talk about my ideas for finding out about patterns</li> </ul>  | <ul style="list-style-type: none"> <li>• I use my senses to look closely for patterns</li> <li>• I observe more than one thing at a time</li> <li>• I make simple records of what I notice <i>(with help where necessary)</i></li> <li>• I use simple equipment to observe &amp; record patterns</li> </ul>                              | <ul style="list-style-type: none"> <li>• I talk about what I have done &amp; the patterns I have noticed</li> </ul>   |
| <b>KEY STAGE ONE</b>       | <ul style="list-style-type: none"> <li>• I ask questions about why and how things are linked</li> <li>• With help, I decide what patterns to observe &amp; measure &amp; suggest how to do it</li> </ul>  | <ul style="list-style-type: none"> <li>• I use non-standard units &amp; simple equipment to record events that might be related</li> <li>• I record in words, pictures or in simple prepared formats such as tables, tally charts &amp; maps</li> </ul>  | <ul style="list-style-type: none"> <li>• I identify simple patterns &amp; talk about them</li> <li>• I make links between two sets of observations</li> <li>• I begin to use scientific language to talk about patterns</li> <li>• I talk about whether the pattern was what I expected</li> </ul>  |
| <b>LOWER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I talk about where patterns might be found and decide when questions can be investigated by pattern seeking</li> <li>• I decide on which sets of data to collect, what observations to make and what equipment to use</li> </ul>                     | <ul style="list-style-type: none"> <li>• I use a range of equipment to collect data using standard measures</li> <li>• I make records using tables, bar charts or simple scatter graphs</li> <li>• I begin to use and interpret data collected through dataloggers</li> </ul>  | <ul style="list-style-type: none"> <li>• I draw conclusions about simple patterns between two sets of data</li> <li>• I talk about patterns using some scientific language</li> <li>• I suggest improvements to the way I looked for patterns</li> </ul>  |
| <b>UPPER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I recognise when variables can't be controlled and when pattern seeking will help to answer my question</li> <li>• I decide how detailed my data needs to be, and which equipment to use, to make my measurements as accurate as possible</li> </ul> | <ul style="list-style-type: none"> <li>• I use equipment accurately to collect observations</li> <li>• I record data appropriately and accurately</li> <li>• I present data in scatter graphs and frequency charts</li> <li>• I recognise patterns in results</li> <li>• I recognise the effect of sample size on reliability</li> </ul> | <ul style="list-style-type: none"> <li>• I draw valid conclusions from data about patterns and recognise their limitations</li> <li>• I recognise the significance of relationships between sets of data</li> <li>• I talk about and explain cause and effect patterns using scientific knowledge &amp; understanding</li> <li>• I evaluate how well I looked for patterns</li> </ul> |

## RESEARCH

| RESEARCH                   |   |  |   |
|----------------------------|---|--|---|
|                            | <b>PLAN</b>   | <b>DO</b>  | <b>REVIEW</b>   |
| <b>EYFS</b>                | <ul style="list-style-type: none"> <li>• I am curious about things in my surroundings</li> <li>• With help, I ask questions that I can answer using secondary sources</li> </ul>                                  | <ul style="list-style-type: none"> <li>• I listen carefully</li> <li>• I know that information in books and electronic media can be used to answer questions</li> <li>• I find pictures of things</li> <li>• I talk to people about what they do and how things work</li> </ul>  | <ul style="list-style-type: none"> <li>• I talk about things I found out</li> </ul>   |
| <b>KEY STAGE ONE</b>       | <ul style="list-style-type: none"> <li>• I ask questions about how things are and the way they work</li> <li>• With help, I make suggestions about how to find things out</li> </ul>                              | <ul style="list-style-type: none"> <li>• I use simple books and electronic media to find things out</li> <li>• I ask questions to find out what people do and how things work</li> <li>• I record in words and pictures what I found out</li> </ul>  | <ul style="list-style-type: none"> <li>• I begin to use scientific language to talk about what I found out</li> <li>• I talk about whether the information source was useful</li> <li>• I give an opinion about some things I found out</li> </ul>  |
| <b>LOWER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I talk about how things are and the way they work</li> <li>• I decide what questions can be answered by research using secondary sources</li> </ul>                      | <ul style="list-style-type: none"> <li>• I use information sources to find the information I need</li> <li>• I use someone else's data</li> <li>• I record what I found out in my own words</li> <li>• I present information in different ways</li> </ul>  | <ul style="list-style-type: none"> <li>• I draw conclusions from what I found out from different sources</li> <li>• I talk about what the data &amp; information means using some scientific language</li> <li>• I suggest ways to improve how I find out and use information</li> </ul>  |
| <b>UPPER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I recognise when research using secondary sources will help to answer my questions</li> <li>• I decide which sources of information might answer my questions</li> </ul> | <ul style="list-style-type: none"> <li>• I use relevant information and data from a range of sources</li> <li>• I recognise how data has been obtained</li> <li>• I start to notice when information and data is biased or based on opinions rather than facts</li> <li>• I present my findings in suitable formats</li> </ul> | <ul style="list-style-type: none"> <li>• I draw valid conclusions from my research</li> <li>• I talk about and explain my research using scientific knowledge &amp; understanding</li> <li>• I evaluate how well my research has answered my questions</li> <li>• I recognise that some questions may not have been answered definitively.</li> </ul> |

## COMPARATIVE and FAIR TESTING

|                            | <b>PLAN</b>  | <b>DO</b>   | <b>REVIEW</b>  |
|----------------------------|--|---|--|
| <b>EYFS</b>                | <ul style="list-style-type: none"> <li>• I am curious about how things behave</li> <li>• With help, I ask questions about things I can test</li> <li>• I talk about my ideas for testing how things behave</li> </ul>  | <ul style="list-style-type: none"> <li>• I use my senses to look closely at how things behave</li> <li>• I carry out simple tests</li> <li>• I make simple records of what I notice (<i>with help where necessary</i>)</li> <li>• I use simple equipment to observe and record</li> </ul> | <ul style="list-style-type: none"> <li>• I talk about what I have noticed</li> <li>• I talk about whether something makes a difference</li> </ul>  |
| <b>KEY STAGE ONE</b>       | <ul style="list-style-type: none"> <li>• I ask why and how questions</li> <li>• I make comparisons about how things behave</li> <li>• With help, I notice links between cause and effect</li> <li>• With help, I identify simple variables to change and measure</li> <li>• I plan simple comparative tests</li> </ul>   | <ul style="list-style-type: none"> <li>• I use non-standard units and simple equipment to record data</li> <li>• I record in words, pictures, or in simple prepared formats such as table &amp; tally charts</li> </ul>   | <ul style="list-style-type: none"> <li>• I talk about my data</li> <li>• I use comparative data to rank materials or objects</li> <li>• I use simple scientific language to describe simple causal relationships</li> <li>• With help, I can say if my test was fair</li> <li>• I say if the relationship was what I expected</li> </ul>   |
| <b>LOWER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I talk about links between cause and effect and (<i>with help</i>) pose a fair test question</li> <li>• I help to plan a fair or comparative test</li> <li>• I decide what data to collect</li> <li>• I decide what equipment to use and how to make observations</li> </ul>  | <ul style="list-style-type: none"> <li>• I use a range of equipment to collect data using standard measures</li> <li>• I make records using tables and bar charts</li> <li>• I begin to use and interpret data collected through dataloggers</li> </ul>                                   | <ul style="list-style-type: none"> <li>• I draw simple conclusions from my fair tests</li> <li>• I talk about and explain simple causal relationships using some scientific language</li> <li>• I suggest ways that I can improve my fair tests</li> </ul>   |
| <b>UPPER KEY STAGE TWO</b> | <ul style="list-style-type: none"> <li>• I recognise when variables need to be controlled and decide when a comparative or fair test is the best way to answer my question</li> <li>• I plan a comparative or fair test, selecting variables to measure, change and keep the same</li> <li>• I decide what equipment to use to make my measurements as accurate as possible</li> </ul> | <ul style="list-style-type: none"> <li>• I use equipment accurately to collect observations</li> <li>• I record data appropriately and accurately</li> <li>• I present data in line graphs</li> <li>• I identify causal relationships</li> </ul>  | <ul style="list-style-type: none"> <li>• I draw valid conclusions based on the data</li> <li>• I recognise the significance of the results of fair and comparative tests</li> <li>• I talk about and explain causal relationships using scientific knowledge and understanding</li> <li>• I evaluate the effectiveness of my fair and comparative testing, recognising variables that were difficult to control</li> </ul> |