

## St Ann's Heath Junior School – Science Working Scientifically skills progression

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| <b>Curriculum Intent</b> | <ul style="list-style-type: none"> <li>Prepare our children for life in an increasingly scientific and technological world today and in the future.</li> <li>Equip our children with knowledge, skills and understanding outlined in the Science National Curriculum.</li> <li>Nurture children's curiosity about the world around them and inspire future scientists.</li> <li>Promote scientific enquiry and ensure our children are taught the skills they need to find out more about the world and how it works.</li> <li>Provide practical experiences to encourage and explore areas of science.</li> <li>Recognise working scientifically skills and use these in science lessons and any application of science.</li> </ul> |
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|                              | KS1   | Year 3  | Year 4   | Year 5   | Year 6  |
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| <b>Approaches to Enquiry</b> | <p>Children should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including:</p> <ul style="list-style-type: none"> <li>- observing changes over a period of time</li> <li>- noticing patterns</li> <li>- grouping and classifying things</li> <li>- carrying out simple comparative tests</li> <li>- finding things out using secondary sources of information.</li> </ul> | <p>Children should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including:</p> <ul style="list-style-type: none"> <li>- observing changes over time</li> <li>- noticing patterns</li> <li>- grouping and classifying things</li> <li>- carrying out simple fair tests</li> <li>- finding things out using secondary sources of information.</li> </ul> | <p><b>With increasing confidence,</b> children should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including:</p> <ul style="list-style-type: none"> <li>- observing changes over time</li> <li>- noticing patterns</li> <li>- grouping and classifying things</li> <li>- carrying out simple fair tests</li> <li>- finding things out using</li> </ul> | <p>Children should select the most appropriate ways to answer science questions using different types of science enquiry, including:</p> <ul style="list-style-type: none"> <li>- observing changes over different periods of time</li> <li>- noticing patterns</li> <li>- grouping and classifying things</li> <li>- carrying out fair tests</li> <li>- finding things out using a wide range of secondary sources of information.</li> </ul> | <p><b>With increasing confidence,</b> children should select the most appropriate ways to answer science questions using different types of science enquiry, including:</p> <ul style="list-style-type: none"> <li>- observing changes over different periods of time</li> <li>- noticing patterns</li> <li>- grouping and classifying things</li> <li>- carrying out fair tests</li> <li>- finding things out using a wide range of secondary sources of information.</li> </ul> |

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|                         |  |  | secondary sources of information.   |   |  |
| <b>Asking questions</b> | <p><b>Ask questions about the world around us</b></p> <ul style="list-style-type: none"> <li>- begin to shape questions using different question stems</li> <li>- ask questions about how and why objects, materials and living things: change, are similar or different to each other, connect with each other, are made or work</li> <li>- suggest questions to investigate</li> </ul> | <p><b>Ask <b>some</b> relevant questions and use different types of scientific enquiry to answer them</b></p> <ul style="list-style-type: none"> <li>- begin to make some decisions about which types of enquiry will be the best way of answering questions including observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative <b>and fair tests</b>, finding things out using secondary sources.</li> </ul> | <p><b>Ask relevant questions and use different types of scientific enquiry to answer them</b></p> <ul style="list-style-type: none"> <li>- recognise questions that can be investigated scientifically and those that cannot</li> <li>- make decisions about which types of scientific enquiry will be best to answer questions</li> <li>- ask a clear scientific question</li> <li>- recognise when questions can be answered by first hand or second sources of evidence</li> </ul> | <p><b>Begin to use test results to make predictions to set up further comparative and fair tests.</b></p> <ul style="list-style-type: none"> <li>- begin to 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>Use test results and to make predictions to help raise further questions</b></p> <ul style="list-style-type: none"> <li>- independently ask questions and offer ideas for scientific enquiry</li> </ul>  |
| <b>Planning</b>         | <p><b>Begin to recognise that questions can be answered in different ways</b></p> <p>With support:</p> <ul style="list-style-type: none"> <li>- suggest how to find things out</li> <li>- identify changes to observe and measure</li> <li>- identify patterns to observe and measure</li> </ul>   | <p><b>Begin to use different types of scientific enquiries to answer questions and with support:</b></p> <ul style="list-style-type: none"> <li>- identify different ways to answer a question</li> <li>- choose the most appropriate method</li> </ul>  | <p><b>Use different types of scientific enquiries to answer questions with increasing confidence:</b></p> <ul style="list-style-type: none"> <li>- identify different ways to answer a question</li> <li>- choose the most appropriate method</li> </ul>  | <p><b>Begin to plan different types of scientific enquiries to answer questions</b></p> <ul style="list-style-type: none"> <li>- explain why an enquiry method is the most appropriate to answer a question</li> <li>- plan systematic collection of data and which equipment to use</li> </ul> | <p><b>Plan different types of scientific enquiries to answer questions</b></p> <ul style="list-style-type: none"> <li>- explain why an enquiry method is the most appropriate to answer a question</li> <li>- plan systematic collection of data and which equipment to use</li> </ul> |

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|                 | <ul style="list-style-type: none"> <li>- identify variables to change and measure</li> <li>- identify sorting criteria</li> <li>- suggest how to take measurements</li> <li>- suggest next steps or a sequence of steps in a plan.</li> </ul>  | <p><b>With support, set up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>- decide what observations to make, how often and what equipment to use</li> <li>- decide what measurements to take, how long to make them for and whether to repeat them</li> <li>- decide what sorting or classification criteria to use</li> <li>- recognise when a simple fair test is necessary</li> <li>- with help, decide what variables to change and measure</li> </ul> | <p><b>With increasing confidence, set up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>- decide what observations to make, how often and what equipment to use</li> <li>- decide what measurements to take, how long to make them for and whether to repeat them</li> <li>- decide what sorting or classification criteria to use</li> <li>- recognise when a simple fair test is necessary</li> <li>- decide what variables to change and measure</li> </ul> | <ul style="list-style-type: none"> <li>- plan collection of sufficient data</li> <li>- recognise when research using secondary sources will answer questions</li> <li>- decide which sources of information to use to answer questions</li> </ul> <p><b>Begin to recognise and control variables where necessary</b></p> <ul style="list-style-type: none"> <li>- recognise when variables need to be controlled and why</li> <li>- recognise when variables cannot be controlled and a pattern seeking enquiry is appropriate</li> <li>- identify which variables have the greatest effect on the result.</li> </ul> | <ul style="list-style-type: none"> <li>- plan collection of sufficient data</li> <li>- recognise when research using secondary sources will answer questions</li> <li>- decide which sources of information to use to answer questions</li> </ul> <p><b>Recognise and control variables where necessary</b></p> <ul style="list-style-type: none"> <li>- recognise when variables need to be controlled and why</li> <li>- recognise when variables cannot be controlled and a pattern seeking enquiry is appropriate</li> <li>- identify which variables have the greatest effect on the result.</li> </ul> |
| Collecting data | <p><b>Observing closely, using simple equipment</b></p> <ul style="list-style-type: none"> <li>- choose and use appropriate simple equipment to make observations</li> </ul> <p><b>Performing simple tests</b></p> <ul style="list-style-type: none"> <li>- perform simple tests with support</li> <li>- to begin to discuss my</li> </ul> | <p><b>Begin 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.</b></p> <ul style="list-style-type: none"> <li>- learn to use some new</li> </ul>  | <p><b>Make systematic and careful observations where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</b></p> <ul style="list-style-type: none"> <li>- use a range of equipment including data loggers to collect data using standard</li> </ul>   | <p><b>Begin to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.</b></p> <ul style="list-style-type: none"> <li>- Begin to take accurate and precise measurements.</li> </ul>   | <p><b>Take measurements, using a range of scientific equipment with increasing accuracy and precision</b></p> <ul style="list-style-type: none"> <li>- use a range of equipment accurately without support to collect observations and measurements</li> <li>- repeat sets of observations or measurements, where appropriate, selecting</li> </ul>  |

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|                               | <p>ideas about how to find things out</p> <ul style="list-style-type: none"> <li>- to begin to say what happened in my investigation.</li> </ul> <p><b>Identifying and classifying</b></p> <ul style="list-style-type: none"> <li>- identify and classify with some support.</li> <li>- to begin to observe and identify, compare and describe.</li> </ul> <p><b>Gathering data to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- gather and record data with some adult support, to help in answering questions.</li> <li>- begin to record simple data.</li> <li>- begin to record and communicate their findings in a range of ways.</li> </ul> | <p>equipment appropriately (eg data loggers).</p> <ul style="list-style-type: none"> <li>- set up some simple practical enquiries, comparative and fair tests.</li> <li>- begin to recognise when a simple fair test is necessary and help to decide how to set it up.</li> </ul> <p><b>Gather data in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- gather, record, and begin to classify and present data in a variety of ways to help in answering questions.</li> </ul> | <p>measures</p> <ul style="list-style-type: none"> <li>- with support take accurate measurements on measuring equipment, recognising when to repeat them</li> <li>- carry out simple tests to sort and classify materials according to properties or behaviour</li> </ul> <p><b>Gather data in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- gather data to answer questions from a variety of sources including using textbooks, simple keys, electronic media, first hand observation, practical activity and data collected by others</li> </ul> |   | <p>suitable ranges and intervals</p> <ul style="list-style-type: none"> <li>- use a series of tests to sort and classify materials</li> <li>- use relevant information and data from a range of secondary sources to answer questions</li> </ul> |
| <p><b>Presenting data</b></p> | <p><b>Record data to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- gather and record data with some adult support, to help in answering questions.</li> </ul>   | <p><b>Recording data in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>-begin to record findings using simple scientific language, drawings,</li> </ul>  | <p><b>Recording data in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- make notes</li> <li>- record data in tables and bar charts</li> </ul>   | <p><b>Begin to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and</b></p> | <p><b>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs and models</b></p>  |

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|                          | <ul style="list-style-type: none"> <li>- begin to record simple data.</li> <li>- begin to record and communicate their findings in a range of ways</li> <li>- talk about what has been found out and how</li> <li>- record observations in word and pictures</li> <li>- record observations and test results in simple prepared pictograms, tables, tally charts, bar charts and maps including ICT formats</li> <li>- record sorting in sorting circles or tables</li> </ul> | <p>labelled diagrams, keys, bar charts and tables.</p> <ul style="list-style-type: none"> <li>- begin to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</li> <li>- begin to use notes, simple tables and standard units and help to decide how to record and analyse their data.</li> <li>- begin to record results in tables and bar charts.</li> </ul> | <ul style="list-style-type: none"> <li>- use graphs produced by data loggers</li> </ul> <p><b>Classify in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- use Carroll diagrams, and Venn diagrams to classify</li> <li>- use and make simple keys to identify and classify</li> </ul> <p><b>Present data in a variety of ways to help in answering questions</b></p> <ul style="list-style-type: none"> <li>- drawings, labelled diagrams</li> <li>- bar charts, bar line graphs, simple scatter graphs and tables using ICT where appropriate</li> </ul> | <p><b>line graphs.</b></p> <p>Begin to report and present findings from enquiries.</p> <p>Begin to decide how to record data from a choice of familiar approaches.</p> <p>Begin to choose how best to present data.</p>  | <ul style="list-style-type: none"> <li>- decide how to record data accurately and appropriately</li> <li>- use appropriate scientific language in oral and written presentations</li> <li>- make keys and branching databases with more than 4 items</li> <li>- use more than one source of scientific evidence to identify and classify things</li> <li>- present data in line graphs, scatter graphs and frequency charts</li> </ul> |
| <p><b>Concluding</b></p> | <p><b>Use their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>- use simple scientific language to talk about observation or findings with greater accuracy</li> <li>- use results to answer the investigation questions</li> <li>- identify simple changes</li> <li>- sequence changes</li> <li>- say whether the change was expected</li> </ul>  | <p><b>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b></p> <ul style="list-style-type: none"> <li>- beginning to use results to draw simple conclusions , make predictions for new values, suggest improvements and raise further questions.</li> <li>- beginning to use straightforward scientific</li> </ul>  | <p><b>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b></p> <ul style="list-style-type: none"> <li>- draw simple conclusions about changes observed and link these to scientific ideas</li> <li>- refer to a table or graph when reporting findings</li> <li>- begin to use and interpret graphs produced by data</li> </ul>   | <p><b>Beginning 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.</b></p> <ul style="list-style-type: none"> <li>- Begin to draw conclusions based on their data and observations, use evidence</li> </ul> | <p><b>Report and present findings from enquiries, including conclusions, causal relationships and explanations of results in written forms such as displays and other presentations</b></p> <ul style="list-style-type: none"> <li>- use scientific evidence to answer questions or support findings</li> <li>- draw valid conclusions about changes, similarities</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>- identify similarities and differences</li> <li>- make simple comparisons</li> <li>- make links between two sets of observations</li> <li>- identify simple patterns and talk about them</li> <li>- say whether the pattern was expected</li> <li>- identify simple causal relationships</li> <li>- say if the relationship was expected</li> </ul> | <p>evidence to answer questions or to support their findings.</p> <ul style="list-style-type: none"> <li>- continuing to look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, am beginning to identify new questions arising from the data, make new predictions and find ways of improving what they have already done.</li> </ul> <p><b>Identify differences, similarities or changes related to simple scientific ideas and process</b></p> <ul style="list-style-type: none"> <li>- developing ability see a pattern in my results.</li> <li>- beginning to say what I found out, <b>linking cause and effect.</b></li> <li>- beginning to say how I could make it better.</li> </ul> | <p>loggers</p> <ul style="list-style-type: none"> <li>- draw a simple conclusion about similarities and differences identified and link these to scientific ideas</li> <li>- draw conclusions about simple patterns between two sets of data.</li> <li>- draw simple causal conclusions from fair tests</li> <li>- draw conclusions from data from different secondary sources</li> </ul> <p><b>Identify differences, similarities or changes related to simple scientific ideas and process</b></p> <p>Make links between:</p> <ul style="list-style-type: none"> <li>- observed changes</li> <li>- similarities and differences</li> <li>- simple patterns between two sets of data</li> <li>- simple causal relationships</li> <li>- data from secondary sources</li> </ul> <p>And simple scientific ideas and processes</p> <p><b>Use straightforward scientific evidence to</b></p> | <p>to justify their ideas, use scientific knowledge and understanding to explain their findings.</p> <ul style="list-style-type: none"> <li>- Begin to use test results to make predictions to set up further comparatives and fair tests.</li> <li>- Begin to look for different causal relationships in their data and identify evidence that refutes or supports their ideas.</li> <li>- use their results to identify when further tests and observations are needed.</li> </ul> | <p>and differences, and causal relationships from data collected</p> <ul style="list-style-type: none"> <li>- draw valid conclusions that utilise more than one piece of supporting evidence</li> <li>- use scientific knowledge to explain findings</li> <li>- use simple models to help describe scientific ideas</li> <li>- explain differences in repeated observations or measurements, identifying reasons for any anomalies noticed</li> </ul> |
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|                   |   |   | <p><b>answer questions or to support their findings</b><br/>Refer to evidence from practical tests and observations or from secondary data sources when answering questions or explaining findings</p> <ul style="list-style-type: none"> <li>- Use simple scientific language in a range of oral and written presentations suitable for different audiences to present findings</li> </ul> |  |   |
| <b>Evaluating</b> | <ul style="list-style-type: none"> <li>- say whether data was useful</li> <li>- say whether an information source was useful</li> </ul> <p>Give an opinion about some further information</p> | <p><b>Beginning to use results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions</b></p> <ul style="list-style-type: none"> <li>- beginning to make predictions for new values within or beyond the collected data collected</li> <li>- beginning to identify new questions arising from the data</li> <li>- starting to find ways of improving enquiries</li> </ul> | <p><b>Use results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions</b></p> <ul style="list-style-type: none"> <li>- make predictions for new values within or beyond the collected data collected</li> <li>- identify new questions arising from the data</li> <li>- find ways of improving enquiries</li> </ul>              | <p><b>Identify scientific evidence that has been used to support or refute ideas or arguments</b></p> <ul style="list-style-type: none"> <li>- Begin to identify scientific evidence that has been used to support or refute ideas or arguments.</li> <li>- begin to separate opinion from fact.</li> <li>- begin to draw conclusions and identify scientific evidence. Can use simple <b>models</b>.</li> <li>- know which evidence proves a scientific point</li> <li>- begin to use test results to make predictions to set up</li> </ul> | <p><b>Identify scientific evidence that has been used to support or refute ideas or arguments</b></p> <ul style="list-style-type: none"> <li>- begin to separate opinion from fact</li> <li>- use scientific evidence to justify ideas</li> <li>- talk about how scientific ideas have developed over time</li> </ul> <p>Identify when further tests and observations might be needed</p> <p>Evaluate the effectiveness of their working methods,</p> |

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|  |  |  |  | further comparative and fair tests<br>- identify when further tests and observations might be needed | making practical suggestions for improving them |
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