# Hart Primary School Science Disciplinary Knowledge Strand Progression Document

| | EYFS (including 0-3) | KS1 | Lower KS2 | Upper KS2 | KS3 |
|---|---|---|---|---|---|
| **Asking questions**<br>Asking questions that can be answered using a scientific enquiry. | - Understand 'why' questions like: "why do you think the caterpillar got so fat?" (CL)<br>- Answer simple 'why' questions. (CL) -Ask questions to find out more and to check they understand what has been said to them (CL) | - Formulate and ask simple questions | ☐ Raise their own relevant questions about the world around them | ☐ Use their scientific experiences to explore ideas and raise different kinds of questions. | ☐ Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience |
| **Making predictions**<br>Using prior knowledge to suggest what will happen in an enquiry. | ☐ Pupils begin to say what they think might happen. | ☐ Pupils can say what they think might happen. | ☐ Pupils can make predictions based on evidence (often experiential, anecdotal or based on substantive knowledge from previous years) With<br>☐ support, pupils identify new questions arising from their data, make predictions for new values within or beyond their data they have collected | ☐ Pupils can apply their substantive knowledge to make reasonable and justified predictions.<br>☐ Pupils can identify new questions arising from their data, make predictions for new values within or beyond their data they have collected | ☐ Make predictions using scientific knowledge and understanding |

| | | | | | |
|---|---|---|---|---|---|
| **Setting up tests**<br>Deciding on the method and equipment to use to carry out an enquiry.  | Choose the right resources to carry out their own plan. For example, choosing a spade to enlarge a small hole they dug with a trowel (PD) | - Experience different types of science enquiries, including practical activities<br>- Begin to recognise different ways in which they might answer scientific questions Carry<br>- out simple tests | ☐ Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.<br>☐ Use different types of scientific enquiries to answer questions. Set<br>☐ up simple practical enquiries, comparative and fair tests.<br>☐ Recognise when a simple fair test is necessary and help decide how to set it up. Recognise how and<br>☐ when secondary sources might help them to answer questions that cannot be answered through practical investigations<br>Help to make decisions<br>☐ about what observations to make, how long to make them for and the type of simple equipment that might be used. | ☐ Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.<br>☐ Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.<br>☐ To know what independent, dependent and control variables are.<br>☐ Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.<br>☐ Make their own decisions about what observations to make, what measurements to use and how long to make them for. | ☐ Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate. Evaluate risks<br>☐ Pay attention to objectivity<br>☐ and concern for accuracy, precision, repeatability and reproducibility<br>Apply sampling techniques<br>☐ |

| | | | | | |
|---|---|---|---|---|---|
| **Observing and measuring**<br>Using senses and measuring equipment to make observations about the enquiry.<br>  | • Explore materials with different properties (UtW 0-3)<br>• Explore natural materials, indoors and outside (UtW 0-3)<br>• Explore and respond to different natural phenomena in their setting and on trips (UtW 0-3)<br>• Explore how things work (UtW)<br>• Use all their senses in hands-on exploration of natural materials (UtW)<br>• Explore collections of materials with similar and/or different properties (UtW) | Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)<br>Observe closely using simple equipment<br>Thermometers, rain gauge, weather vane, hand lenses, timers, | Talk about criteria for grouping, classifying and sorting and use simple keys.<br>Make systematic and careful observations<br>Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. Take accurate measurements using standard units<br>Learn how to use data loggers appropriately | Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately.<br>Identify and take repeat measurements where appropriate using the data set collected. | Use appropriate techniques, apparatus and materials during fieldwork and laboratory work, paying attention to health and safety.<br>Apply mathematical concepts and calculate results |

| | | | | | |
|---|---|---|---|---|---|
| | • Explore different forces they can feel (UtW)<br>• Explore the natural world around them (UtW)<br>• 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.(UtW)<br>• Make comparisons between objects relating to size, length, weight and capacity (Mathematics)<br>• Explore a range of sound makers and instruments and play them in different ways (EAD 0-3)<br>• Explore different materials, using all their senses to investigate them. Manipulate and play with different materials (EAD 0-3) | ☐ With support, observe changes over time Use<br>☐ simple measurements and equipment to gather data. | | | |
| **Recording data**<br>Using tables, drawings and other means to note observations and measurements. | Explore the natural world around them, making observations and drawing pictures of animals and plants. (UtW)<br>Use drawing to represent ideas like movement or loud noises (EAD)<br>Create closed shapes with continuous lines, and begin to use these shapes to represent objects (EAD) | - Record simple data in given tables | ☐ Record data from their own observations and measurements in a variety of ways: notes, bar charts, tables, standard units, drawings, labelled diagrams, keys. | ☐ Recognise and use keys and branching diagrams to identify, classify and describe living things and materials. Decide<br>☐ how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs with multiple factors, bar and line graphs. | ☐ Use and derive simple equations and carry out appropriate calculations<br>☐ Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature Make and<br>☐ record observations and measurements using a range of methods of different investigations. |

| | | | | | |
|---|---|---|---|---|---|
| **Interpreting and communicating results**<br>Using information from the data to say what you found out. | Talk about what they see, using a wide vocabulary.(UtW) Talk about different forces they can feel. (UtW) Talk about the differences between materials and changes they notice (UtW) Describe what they see, hear and feel whilst outside (UtW) Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps (UtW) Articulate their ideas and thoughts in well-formed sentences (CL) Explain how things work and why they might happen (CL) Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, nonfiction, rhyme and poems where appropriate. (Speaking) | ☐ Use simple secondary sources to find answers With ☐ guidance, notice patterns and relationships ☐ With support, record and communicate their findings in a range of ways and begin to use simple scientific language in their responses. To use a Venn diagram to sort | ☐ Help to make decisions about how to analyse the data they have collected. With help, pupils look ☐ for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. Use relevant scientific ☐ language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions. | ☐ Identify patterns that might be found in the natural environment. ☐ Look for different causal relationships in their data and identify evidence that refutes or supports their ideas. ☐ Identify scientific evidence that has been used to support or refute ideas or arguments ☐ Use relevant scientific language and illustrations to discuss communicate and justify their scientific ideas. ☐ To be able to construct accurate force diagrams with broadly proportionate arrows ☐ Use oral and written forms such as displays and other presentations to report conclusions and causal relationships. | ☐ Undertake basic data analysis including simple statistical techniques Present ☐ observations and data using appropriate methods, including tables and graphs Interpret observations and ☐ data, including identifying patterns and using observations, measurements and data to draw conclusions Present reasoned explanations, ☐ including explaining data in relation to predictions and hypotheses |
| **Evaluating**<br>Reflecting on the success of the enquiry approach and identifying further questions for enquiry. | Repeat actions that have an effect (UtW 0-3) | ☐ Use their observations/ ideas to suggest answers to questions. Be ☐ able to talk about what they found out and how they found it out. | ☐ With support, pupils identify new questions arising from their data, make predictions for new values within or beyond their data they have collected and find ways of improving what they have already done. | ☐ Talk about how scientific ideas have developed over time. ☐ Pupils can report the degree of trust in results. ☐ Use their results to make further predictions and identify when further observations, comparative and fair tests might be needed. Pupils have a developing sense ☐ of the scope of their data and conclusions are proportionate to this. | ☐ 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. Evaluate the ☐ reliability of methods and suggest possible improvements. Evaluate ☐ data, showing awareness of potential sources of random and systematic error |

Green indicates the coverage of development of scientific knowledge which is threaded through our disciplinary knowledge coverage.