# Sutton Park Primary School

## Science Disciplinary Knowledge Progression

| QUESTIONS (leading to a scientific enquiry) | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| ask simple questions *[stimulated by the world around them]*<br><br>demonstrate curiosity *[by the questions they ask]* | raise their own questions based on *[or linked to]* things they have observed | explore *[their own]* ideas about 'what if….?' scenarios e.g. humans did not have skeletons<br><br>*[begin to understand that some questions are testable/ can be tested in the classroom and some cannot]*<br><br>*[within a group]* suggest relevant questions about what they observe and about the world around them | *[choose/select]* a relevant question that can be answered *[by research or experiment/test]*<br><br>ask/raise their own relevant questions *[with increasing confidence and independence]* about what they observe and about the world around them | raise different kinds of questions<br><br>*[refine]* a scientific questions so that it can be investigated<br><br>ask their own pertinent questions | raise different kinds of questions<br><br>*[recognise scientific questions that do not yet have definitive answers]*<br><br>use observations/data gathered to construct a further *[testable or research]* question |

| PLANNING (comparative and fair testing) | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| begin to choose/suggest ways to find answers<br><br>perform simple tests/comparative tests<br><br>talk about ways of answering their questions<br><br>use different types of scientific enquiry<br><br>experiment with a wide variety of things | set up a comparative test<br><br>*[in a group,]* choose/suggest ways in which they might answer scientific questions<br><br>suggest a *[practical way]* to find answers to their questions *[and listen to the suggestions of others]*<br><br>use different types of scientific enquiry to answer their own questions | help to decide about how to set up a simple fair test *[and begin to recognise when a test is not fair]*<br><br>*[as a group, begin to]* make some decisions about the best way of answering *[their questions]*<br><br>*[with support/as a group],* set up simple practical enquiries incl. comparative and fair tests *[e.g. make a choice from a list of at least one variable that needs to be kept the same when conducting a fair test]*<br><br>find [suggest] a way to compare [things] (e.g. materials, magnets) | investigate the effect of something on something else<br><br>start to make their own decisions about the most appropriate type of science enquiry they might use to answer scientific questions *[is a fair test the best way to investigate their question]*<br><br>recognise when a simple fair test is necessary<br><br>carry out simple fair tests *[with increasing confidence and make some of the planning decisions about what to change and measure/observe]* | explain which variables need to be controlled and why<br><br>*[make most of the planning decisions about]* and carry out fair tests<br><br>recognise when it is appropriate to carry out a fair test and plan how to set it up | plan enquiries, including recognising and controlling variables where necessary<br><br>select and plan the most appropriate type of science enquiry to use to answer scientific questions |

| EQUIPMENT AND MEASUREMENT | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| observe *[using non-standard units e.g. how many lolly sticks/cubes/handfuls, etc.]*<br><br>observe closely, using simple equipment (e.g. hand lenses, egg timers)<br><br>observe closely using their senses | observe more accurately by measuring *[non-standard and standard units]*<br><br>use their senses, simple measurements and equipment to gather data *[with increasing independence]*<br><br>gather data to help in answering questions | collect data from their own observations and measurements, using notes, simple tables and standard units<br><br>help to make *[some]* decisions about what observations to make, how long to make them for and the type of simple equipment that might be used<br><br>make *[simple]* accurate measurements using *[whole number]* standard units, using a range of equipment, (for e.g. data loggers)<br><br>gathering data in a variety of ways to help in answering questions<br><br>learn how to use new equipment, such as data loggers<br><br>explore *[observe with increased accuracy]* using a hand lens or microscope | begin to identify where patterns might be found and use this to begin to identify what data to collect<br><br>make *[more of the]* decisions about what observations to make, how long to make them for and the type of equipment that might be used<br><br>learn how to use new equipment, such as data loggers & measure temperature in degrees Celsius (°C) using a thermometer<br><br>*[understand]* precautions for working safely<br><br>collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record these data<br><br>make accurate measurements using standard units *[and more complex units & parts of units]* using a range of equipment, (for e.g. data logger, thermometer) | recording data and results of increasing complexity<br><br>follow safety guidelines<br><br>make their own decisions about what observations to make or measurements to use and how long to make them for *[recognising the need for repeat readings on some occasions]*<br><br>decide how to record data from a choice of familiar approaches<br><br>choose the most appropriate equipment to make measurements<br><br>explain how to use equipment accurately | *[recognise that data might be unreliable and describe how to make it more reliable]*<br><br>make their own decisions about what measurements to take *[and identify the ranges and intervals used]*<br><br>take measurements, using a range of scientific equipment, with increasing accuracy and precision *[reading scales accurately]*<br><br>choose and use correctly the most appropriate equipment to support observation, make measurements, collect data<br><br>record data and results of increasing complexity<br><br>follow *[and suggest]* safety guidelines |

| CONSIDERING THE RESULTS (PATTERN SEEKING) | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| sequence photographs*[of an event/observation]*<br><br>observe changes over different periods of time and discuss/talk/record about what has happened<br><br>talk/ discuss/ describe/record about what they have seen/ what has happened | with guidance, begin to notice patterns and relationships<br><br>order their findings<br><br>*[recognise if results matched predictions]*<br><br>talk/ discuss/ describe/record with some accuracy what they have seen/ what has happened | describe and compare the effect of different factors *[on something]*<br><br>with help, look for changes and patterns in their observations and data<br><br>Use *[their]* results *[to consider whether they meet predictions]* | notice/find patterns in their observations and data<br><br>describe the effect of something/different factors on something else<br><br>help to make decisions about how to analyse *[their]* data | identify patterns that might be found in the natural environment<br><br>look for patterns and notice relationships between things *[and describe these]* | look for different causal *[cause and effect]* relationships in their data *[something effecting something else]* and *[describe the pattern succinctly]*<br><br>identify patterns that might be found in the natural environment over long periods of time *[and describe how these have been used to develop scientific theories (e.g. evolution)]* |

| EVALUATING DATA and WRITING CONCLUSIONS | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| read and spell scientific vocabulary<br><br>*[suggest]* how things happen<br><br>use their observations and ideas to suggest answers to questions<br><br>begin to use simple scientific language to talk about what they have found out<br><br>talk about what they have found out | begin to explain how they know… [*use the word because "it is because…."*]<br><br>*[suggest]* how and/or why things happen<br><br>draw on [use] their results [and their own experience] to answer their questions<br><br>begin to use simple scientific language to describe or explain what they have found out<br><br>read and spell scientific vocabulary | read and spell scientific vocabulary correctly and with confidence<br><br>use*[their own experience & some evidence or ]* results to draw simple conclusions and answer questions<br><br>talk about and record their findings using simple scientific language<br><br>explain why things have happened<br><br>*[say whether what happened was what they expected and notice any odd results that seem odd]* | begin to develop their ideas about relationships and interactions<br><br>reporting on findings from enquiries *[beginning to identify the scientific facts in their data]*<br><br>use relevant scientific language to discuss, communicate, report their findings<br><br>read and spell scientific vocabulary correctly and with confidence<br><br>use results to suggest improvements, new questions and predictions for setting up further tests<br><br>with help, pupils should look for similarities and differences in their data *[between different groups of results]* | use their developing scientific knowledge and understanding and relevant scientific language to explain their findings<br><br>draw conclusions based on their data and observations<br><br>read, spell and pronounce scientific vocabulary correctly<br><br>use test results to make predictions to set up further comparative and fair tests<br><br>*[comment on how reliable their data is]* | identify evidence that refutes or supports their ideas<br><br>use their evidence to justify their ideas<br><br>use correct scientific knowledge and understanding and relevant scientific language to explain their findings<br><br>read, spell and pronounce scientific vocabulary correctly<br><br>use their results to identify when further comparative tests and observations might be needed<br><br>*[be able to explain differences in repeated measurements/readings or unexpected results]*<br><br>*[recognise the limitations of some data]* |

| OBSERVATION and RECORDING | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| begin to communicate and record their findings using simple scientific language<br><br>begin to use simple scientific language to talk about what they have *[seen]*<br><br>*[Use their own ideas to offer answers to questions]*<br><br>observe *[and discuss / talk about / draw/ keep records of]* changes over different periods of time<br><br>observe closely *[and discuss / talk about / draw /record the features/properties of things in the real world]* | record and communicate their findings using simple scientific language<br><br>*[Use their own ideas and their observations to offer answers to questions*]<br><br>observe and describe simple processes/cycles *[with several steps] [e.g. growth cycle, simple food chain, saying how living things depend on one another]*<br><br>recognise and describe a series of changes over time (e.g. growth)<br><br>observe, and record *[make drawings to represent]* things in the real world with some accuracy | observe and record relationships between structure and function<br><br>observe and record changes /stages over time<br><br>explore / observe things in the local environment / real contexts and record observations<br><br>record *[observations/explorations/* processes] using simple scientific language | suggest their own ideas on a concept and compare these with what they observe / find out<br><br>develop simple descriptions from their observations use relevant scientific language to discuss their ideas<br><br>observe and record relationships between structure & function<br><br>observe and record changes /stages over time<br><br>explore / observe things in the local environment / real contexts and record observations | read, spell and pronounce scientific vocabulary correctly<br><br>use their developing scientific knowledge and understanding and relevant scientific language to discuss, communicate and explain their findings<br><br>explore more abstract systems/functions/changes and record their understanding of these (e.g. circulatory system)<br><br>observe changes over different periods of time | encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates<br><br>use correct scientific knowledge and understanding and relevant scientific language to explain their findings and justify their scientific ideas<br><br>explore more abstract systems/functions /changes/<br>behaviours and record their understanding of these (e.g. the relationship between diet, exercise, drugs, lifestyle and health; evolutionary changes; burning, rusting; reflection and refraction of light; friction, air resistance, gravity)<br><br>read, spell and pronounce scientific vocabulary correctly |

| COMMUNICATING DATA | | | | | |
|---|---|---|---|---|---|
| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| present their findings in a range of ways *[using templates where necessary]* e.g. talk/discuss; *write*/describe; draw pictures; *[annotated photographs; video];* make/construct tables, charts and displays<br><br>communicate their ideas to a range of audiences in a variety of ways<br><br>begin to use [some] simple scientific language | record and communicate their findings in a range of ways *[with increasing independence]* e.g. talk/discuss; *write*/describe; draw pictures; *take photographs; video;* make/construct *[a variety of]* tables, charts *[including simple, bar charts produced as a group]* and displays<br><br>*[make some choices on how to]* communicate their ideas to a range of audiences in a variety of ways<br><br>use simple scientific language in their recording<br><br>record simple data with some accuracy<br><br>record data to help in answering questions | record and present findings using simple scientific language and vocabulary, including discussions, oral and written explanations, notes, drawings *[annotated],* pictorial representations, labelled diagrams, simple tables, bar charts *[using ranges and intervals (scales) chosen for them]* displays or presentations<br><br>record, classify and present data in a variety of ways to help in answering questions<br><br>communicate their findings in ways that are appropriate for different audiences | record findings using simple scientific language and vocabulary, including discussions, oral and written explanations, notes, drawings *[annotated],* pictorial representations, labelled diagrams, tables and bar charts *[where intervals and ranges agreed through discussion]*, displays or presentations<br><br>*[begin to select the most useful]* ways to record, classify and present data *[from a range of choices]*<br><br>*[make decisions on how best to]* communicate their findings in ways that are appropriate for different audiences | record data and results of increasing complexity using tables, bar and line graphs, and models<br><br>report findings from enquiries using discussion, drawings *[annotated]*, oral and written explanations of results, and conclusions<br><br>present findings in written form, displays and other presentations | *[Make decisions on the most appropriate format to present scientific data]*<br><br>record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models<br><br>report findings from enquiries using discussion, drawings *[annotated]*, oral and written explanations of results, explanations involving causal relationships, and conclusions<br><br>present findings in written form, displays and other presentations |

| SORT/GROUP/CLASSIFY/IDENTIFY | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| name/Identify common examples and *[some common features]*<br><br>with help, decide how to sort and group *[objects, materials or living things]*<br><br>*[say/identify]* how different things change *[objects, materials or living things]*<br><br>make comparisons between simple *[observable]* features/characteristics of objects, materials and living things<br><br>*[say]* how things are similar or different<br><br>*[recognise basic features* of objects, materials and living things*]* | compare and contrast *[…a variety of things - focusing on the similarities as well as the differences]* including how different *things* change over different periods of time *[objects, materials or living things]*<br><br>sort and classify things according to a variety of different features (e.g. "I know it is living because it ... and it...)<br><br>decide how to sort and group *[objects, materials or living things]*<br><br>*name/Identify a variety of common features and/or uses [for objects, materials or living things]*<br><br>name/Identify common examples and *[some common features]* | compare and contrast functions, diets, teeth, changes over time<br><br>record similarities and differences<br><br>decide ways and give reasons for sorting, grouping, classifying, identifying [things]/[*objects, living things, processes or events*] based on specific characteristics | make a simple guide [to local living things]<br><br>use guides or simple keys to classify / identify [local small invertebrates]<br><br>*[use their observations]* to identify and classify<br><br>record similarities, differences or changes [related to simple scientific ideas or processes or more complex groups of objects/living things/events] and begin to give reasons for these | compare and contrast things beyond their locality<br><br>compare more complex processes, systems, functions (e.g. life cycles of different living things, organ systems of different animals)<br><br>suggest reasons for similarities and differences | compare and contrast things beyond their locality and analyse advantages/disadvantages, pros/cons of their findings<br><br>use and develop classification systems, keys and other information records *[databases]* to classify or identify<br><br>compare and contrast more complex processes, systems, functions (e.g. sexual and asexual reproduction) |

| RESEARCH | | | | | |
|---|---|---|---|---|---|
| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| *[Find out about the work of famous scientists (historical & modern day)]*<br><br>use simple and appropriate secondary sources (such as books, photographs and videos) to find things out / find answers<br><br>ask people questions | *[Find out about the work of famous scientists - historical & modern day]*<br><br>use simple and appropriate secondary sources (such as books, photographs and videos) to find things out / find answers<br><br>ask people questions | *[create/invent/* ] design something based on what they have found out *[applying both research and/or practical experiences}*<br><br>*[find out about the work of famous scientists (historical & modern day)]*<br><br>finding things out using secondary sources of information | recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations<br><br>*[create/invent/* ] design something based on what they have found out *[applying both research and/or practical experiences}*<br><br>*[find out about the work of famous scientists (historical & modern day)]* | *[research the work of famous scientists (historical & modern day) and use this to]* find out how scientific ideas have changed over time<br><br>find things out using a wide range of secondary sources of information | *[research the work of famous scientists (historical & modern day) and use this to]* explain how scientific ideas have developed over time and had an impact on our lives<br><br>Interview *[people to find out information and collect data]*<br><br>recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact |

| MODELLING | | | | | |
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| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| | | *[act out something to represent something else about the world around us]* | *[make a visual representation or a model of something to represent something they have seen or a process that is difficult to see]* (e.g. digestive system)<br><br>Suggest their own ideas on a concept and compare these with models or images | Create and use simple models to describe scientific ideas (e.g. of movements of the Sun and Earth, solar system, shadow clocks, magnetic compasses for navigation) | *[identify some positives and some limitations of models used to describe/explain scientific ideas]*<br><br>Use and make own versions of simple models to describe and explain scientific ideas (e.g. periscopes, simple lever, burglar alarm) |