Featherstone Primary School: Progression and Sequencing within Science

Intent: Albert Einstein said, "The important thing is not to stop questioning; curiosity has its own reason for existing." Through our teaching and learning of Science, children develop a sense of excitement and curiosity about natural phenomena and whilst there are often answers in Science, this knowledge is only as good as the latest, accepted theory and so children are encouraged to question evidence and discoveries from the scientific greats of the past and present.

During learning, the knowledge, methods, processes and uses of Science are taught and learnt in a variety of contexts. We apply constructivist theory to many areas of our Curriculum and especially Science, acknowledging that children are not 'empty vessels' that come to school to be 'filled' with 'real, correct Science.' Children question and often lead the line of scientific enquiry. Ultimately, learning is an active, not passive process, and teachers facilitate this learning, helping children to deepen their scientific understanding.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Content Knowledge (refer to NC)	**Plants** **Animals incl. humans** **Everyday materials** **Seasonal changes**	**Living things and their habitats** **Plants** **Animals incl. humans** **Everyday materials**	**Plants** **Animals incl. humans** **Rocks** **Light** **Forces and magnets**	**Living things and their habitats** **Animals incl. humans** **States of Matter** **Sound** **Electricity**	**Living things and their habitats** **Animals incl. humans** **Properties and changes in materials** **Earth and Space** **Forces**	**Living things and their habitats** **Animals incl. humans** **Evolution and inheritance** **Light** **Electricity**
Scientists and Inspirational People	**Plants:** Beatrix Potter **Animals incl humans:** Chris Packham and Helen Adams Keller **Everyday materials:** Williams Addis, Charles Mackintosh **Seasonal Changes:** Dr Steve Lyons, Holly Green	**Living things and their habitats:** Steve Backshall, Liz Bonnin **Plants:** Agnes Arber, Alan Titchmarsh **Animals incl. humans:** Steve Irwin, Robert Winston, Joe Wicks **Everyday materials:** John MacAdam, John Dunlop	**Plants:** Joseph Dalton Hooker **Animals incl. humans:** Adelle Davis, Marie Curie, Mae C. Jemison **Rocks:** Mary Anning, Inge Lehmann **Light:** Hasan Lbn al-Haytham, William Herschel, Isaac Newton **Forces and magnets:** Williams Gilbert, Andre Marie Ampere, Leo Theremin	**Living things and their habitats:** Carl Linnaeus, David Attenborough, President Teddy Roosevelt **Animals incl. humans:** Ivan Pavlov, Alexander Fleming **States of Matter:** Robert Boyle, Dmitri Mendeleev, Anders Celsius, Daniel Fahrenheit, Svante Arrhenius **Sound:** Aristotle, Galileo Galilei, Alexander Graham Bell **Electricity:** Thomas Edison, Joseph Swan	**Living things and their habitats:** Jaques Cousteau, Dame Jane Morris Goodall, James Brodie of Brodie **Animals incl. humans:** Marian Merian, Eva crane, John Tyler Bonner **Properties and changes in materials:** Spencer Silver, Ruth Benerito **Earth and Space:** Galileo Galilei, Stephen Hawkins, Brian Cox **Forces:** The Ancient Greeks, Aristotle, Foucault, Galileo, Isaac Newton, Albert Einstein, Otto Von Guericke, John Kemp Starley	**Living things and their habitats:** Carl Linnaeus **Animals incl. humans:** Justus von Liebig, Sir Richard Doll, Leonardo Da Vinci **Evolution and inheritance:** Mary Anning, Charles Darwin and Alfred Wallace **Light:** Thomas Young, Percy Shaw, James Clerk Maxwell **Electricity:** Alessandro Volta, Nicola Tesla

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Planning stage	**Planning a scientific investigation**	With support, identify whole-class questions that can be tested Perform simple tests	Identify questions that can be tested with growing independence Identify what needs to be measured so the question can be answered Understand that questions can be answered in a variety of ways	Identify variables with growing independence: **Independent** (the variable(s) that are altered, i.e. changing the amount of water a plant receives in an experiment about plant growth) **Controlled** (the variable(s) that are kept the same, i.e. the type of battery in a circuit experiment) **Dependent** (the variable being tested or measured, i.e. time taken, height reached, power shown) Choose a question to answer in a scientific enquiry Make predictions with some clear justifications		Identify and list multiple variables: independent, dependent and controlled Suggest and refine a question to answer in a scientific enquiry Suggest a method and equipment Make and fully justify predictions Suggest risks and safety advice	
Scientific methods used to answer questions	**Observations in a range of scientific contexts**	Observe closely the changes over time, noticing the patterns and relationships		With teacher support and guidance, make systematic and careful observations and understand why scientists need to do this	Make systematic and careful observations (i.e. knowing to observe the phenomena every five minutes precisely)		No new observation over time experiments/ expectations in Year Six. Teaching may include observations over time if appropriate to the content knowledge and/or to ensure that learning is not lost.
	Identifying, classifying and grouping in a range of scientific contexts	Name materials Sort and group	Make and explain comparisons	Identify differences, similarities or changes relating to content knowledge and/or scientific experiments		No new identifying, classifying and grouping experiments/expectations in Years Five to Six. Teaching may include identifying, classifying and grouping if appropriate to the content knowledge and/or to ensure that learning is not lost.	
	Fair testing in a range of scientific contexts	Scientific method of fair testing not taught in Key Stage One		During the fair test experiment, show an awareness of the variable(s) identified during the planning stage so that the test is conducted to the level of fairness that was pre-planned. Can talk about why a test is or is not fair in general terms	Can talk about why a test is or is not fair, linking this to some understanding of the variables that were identified	Can talk about why a test is or is not fair, linking this understanding to: • the variables (i.e. a control variable was missed and/or an accidental independent variable) and/or • the process of the experiment (i.e. alterations made during an enquiry; not enough data collected)	
	Pattern seeking in a range of scientific contexts	Scientific method of pattern seeking not taught in Years One – Three			Identify patterns Identify anomalies	Identify patterns and why it occurred Identify and explain anomalies	Use patterns and anomalies to refute or prove ideas

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<tr><td rowspan="4">Knowledge of data and analysis</td><td>Working with data to take measurements (incl. apparatus)</td><td>Use senses and simple equipment to gather data</td><td>Use appropriate non-standard measurements (i.e. cubes) and a greater range of equipment to gather data</td><td colspan="2">Take standard unit measurements (i.e. centimetres) using a range of scientific equipment, including thermometers and data loggers
Show growing accuracy when taking measurements</td><td>Take accurate and more complex measurements using a range of scientific equipment
Show accuracy when taking measurements
Take repeated readings where needed and justify</td><td>Take accurate and more complex measurements using a range of scientific equipment
Show accuracy when taking measurements
Take repeated readings where needed and justify
Know and explain when they have enough data/readings</td></tr>
<tr><td>Working with data to record and present</td><td>Record what happened with labelled diagrams
Present data in templates provided</td><td>Construct simple pictograms, tally charts, block diagrams and simple tables to show results</td><td colspan="2">Present scientific data with diagrams with labels and keys, tables and bar charts
Simple scientific language accurately spelt used when recording</td><td>Present scientific data with accurate diagrams and labels, tables, bar and line graphs</td><td>Choose the most appropriate format to accurately present data, with increasing complexity, from: scientific diagrams and labels, classification keys, tables, bar and line graphs</td></tr>
<tr><td rowspan="2">Working with data to explain and conclude</td><td rowspan="2">Discuss method and findings
Use their observations and ideas to suggest answers to questions</td><td rowspan="2">Suggest ideas to scientific questions based on the data measured and recorded</td><td colspan="4">Report and present findings from enquiries, including: verbal and written explanations, displays and presentations.</td></tr>
<tr><td>Suggest answers to scientific questions based on the data measured and recorded
Make a simple conclusion about what the test shows
List another question that develops from the experiment</td><td>Suggest answers to scientific questions based on the data measured and recorded
Compare conclusion to prediction
List further questions that are raised by the experiment</td><td>Suggest answers to scientific questions based on the data measured and recorded
Understand that there is not one scientific method to explore and phenomenon
Think about a further test raised by the experiment</td><td>Suggest answers to scientific questions based on the data measured and recorded
Understand that models and diagrams, whilst helpful, do have their limitations
Set up a further test raised by the experiment</td></tr>
<tr><td>Evaluation stage</td><td>Evaluation of a scientific investigation</td><td>Identify one way that they have ‘acted like a mini scientist’ during the lesson (i.e. looked closely; listened carefully; drew accurately; labelled with correct spelling; used a scientific word)</td><td>State one good thing about an investigation and one improvement that could be made
Basic justification</td><td>Identify methods that help to make scientific data valid
Suggest improvements
Give ideas about whether or not the scientific question has been answered</td><td>Explain what helps to make scientific data valid
Understand how/why accuracy is important in collecting data (i.e. reduction in the chance of an anomaly)</td><td>Evaluate why or why not a test has been accurate or reliable by discussing what could be done differently/better, relating to the variables
Discuss how trustworthy their results are</td><td>Discuss the trustworthiness of results and prevent anomalies through:
• Justifying the choice of the equipment to support data collection
• Repeating observations
• Suggesting alternative investigations to yield similar results</td></tr>
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