Progression in Disciplinary Knowledge at St Dunstan's RC Primary School

Skill and Key Phase	EYFS	KS1	LKS2	UKS2
Asking and answering Scientific questions	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat? • Begin to ask questions about the world around them. • While playing and exploring, the children begin to ask 'I wonder …' questions. • With support, the children think of ideas for answering their questions.	• Use everyday language/begin to use simple scientific words to ask or answer a scientific question. • Suggest ideas, ask simple questions and know that they can be answered/investigated in different ways • Ask a yes/no questions to aid sorting. • Ask one/two simple research questions linked to a topic. • Choose a question to undertake a fair test. • Ask a question about what might happen over time or that is looking for a pattern.	• Use ideas to pose questions, independently, about the world around them. • Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT. • Answer questions using straight forward scientific evidence. • Ask a range of questions to undertake a fair test • Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.	• Ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information. • Ask a range of questions recognising that some can be answered through research and others may not • Ask a range of questions and identify the type of enquiry that will help to answer the questions. • Ask further questions based on results. • Raise different types of scientific questions, and hypotheses.
Observation and Measurement	• Explore the natural world around them, making observations and drawing pictures of animals and plants.	• Make observations linked to answering the question. • Use simple, nonstandard equipment and	• Compare objects based on more sophisticated, observable features and present observations in labelled diagrams.	• Compare not only based on physical properties but also on knowledge gained through previous enquiry.

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	• Use sand timers, sieves, measuring jugs etc as part of guided play or maths lessons. • The children use magnifying glasses or tablets with magnifiers to make observations. • The children test things out to make comparisons e.g. Does the red car go further than the blue car? • With support, make comparisons, using hands and feet and other non-standard measures e.g. building blocks and beakers.	measurements in a practical task. • When appropriate, measure using standard units where all the numbers are marked on the scale. • Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests.	• Make a range of relevant observations linked to the question • Measure using standard units (according to age-related mathematics) where not all the numbers are marked on the scale, and take repeat readings where necessary • Make decisions about what to observe during an investigation. • Make systematic and careful observations. • use a range of equipment for measuring length, time, temperature and capacity	• Measure using standard units using equipment that has scales involving decimals (according to age-related mathematics), and take repeat readings where necessary. • Use dataloggers to measure over time • Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately. • Decide how long to take measurements for • Make their own decisions about which observations to make, using test results and observations to make predictions and decisions (E.g. Take repeat readings, increase sample size)
Identifying and Classifying	• They identify and name objects by matching them with pictures. • The children sort and group objects,	• Compare objects based on obvious, observable features e.g. size, shape, colour, texture etc. • Sort and group objects, materials and living	• Talk about criteria for grouping, sorting and categorising, beginning to see patterns and relationships. • Identify similarities/differences/changes	• Use and develop keys to identify, classify and describe living things and materials.

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	sometimes using their own criteria.	things, with help, according to simple observational features. • Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns. • Use simple secondary sources (such as identification sheets) to name living things. • They describe the characteristics they used to identify a living thing.	when talking about scientific processes. • Use and begin to create simple keys.	• Identify and explain patterns seen in the natural environment.
Making Predictions and Drawing Conclusions	• While playing and exploring, the children begin to ask 'I wonder …' questions.	• Begin to say what might happen in an investigation. • Begin to make predictions • Explain, with help, what they think they have found out. • Use simple scientific language to explain what they have found out.	• Make predictions and begin to give a reason. • Make predictions and give a reason using simple scientific vocabulary. • Use results from an investigation to make a prediction about a further result. • Draw, with help, a simple conclusion based on evidence from an enquiry or observation. • Where appropriate provide oral or written explanations for their findings. • Use recorded data to make predictions, pose new	• Make predictions and give a reason using simple scientific vocabulary. • Base predictions on findings from previous investigations • Use test results to make predictions for further investigations. • Use a simple mode of communication to justify their conclusions on a hypothesis. • Provide detailed oral or written explanations for their findings (Y6)

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			questions and suggest improvements for further enquiries.	• Begin to recognise how scientific ideas change over time. • Identify validity of conclusion and required improvement to methodology. • Discuss how scientific ideas develop over time
Recording and reporting findings	• Record observations pictorially/photographs. • The children, sometimes, draw and write simple labels to record their observations • With support, they record their observations and comparisons e.g. using simple prepared tables, taking photographs, using sorting rings and boxes.	• Begin to record simple data. • Record data in simple prepared tables, tally charts, pictorially or by taking photographs. • Talk about their findings and explain what they have found out Gather data, record and talk about their findings, in a range of ways, using simple scientific vocabulary.	• Record their findings using scientific language and present in note form, writing frames, diagrams, tables and charts • Prepare own tables to record data • Choose appropriate ways to record and present information, findings and conclusions for different audiences (e.g. displays, oral or written explanations). • Sort objects and living things into groups using intersecting Venn and Carroll diagrams • Present what they learnt verbally or using labelled diagrams, bar charts, or time graphs. • Children are supported to present the same data in different ways in order to help with answering the question.	• Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models. • Choose the most effective approach to record and report results, linking to mathematical knowledge • Present what they learnt in a range of ways e.g. different graphic organisers, line graphs and scatter graphs.

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Analysing and Interpreting Data	• Make comparisons between objects ("This leaf is bigger than that one.") and quantities ("There are more flowers on this one."). • The children talk about what they have observed. • The children demonstrate and talk about what they have found out. • • They, sometimes, talk about what they have found out from secondary sources, including non-fiction texts. • The children notice and talk about how they made a difference to an outcome e.g. "My car went further when I pushed it harder.	• Use every day or simple scientific language to ask and/or answer a question on given data. • Identify simple patterns and/or relationships using simple comparative language. • • Talk about the number of objects in each classification group i.e. which has more or less. • Answer their questions using simple sentences using their observations or measurements. • The children recognise 'biggest and smallest', 'best and worst' etc. from their data (E.g. Which material is worst for a waterproof coat?)	• Gather, record and use data in a variety of ways to answer a simple question. • Identify, with help, changes, patterns, similarities and differences in data to help form conclusions. • Use scientific evidence to support their findings.	• Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas. • Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion. • identify results that do not fit the overall pattern
Completing a scientific enquiry, including evaluation		• Follow instructions to complete a simple test individually or in a group. • Do things in the correct order when performing a simple test and begin to recognise when something is unfair.	• Discuss enquiry methods and describe a fair test. • Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables. • Decide how often to take a measurement	• Plan a range of science enquiries, including comparative and fair tests. • Select and plan the most suitable line of enquiry, explaining which variables need to be

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		• Begin to choose equipment to use and decide what to do and what to observe or measure in order to answer the question. • They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.	• Suggest improvement (e.g. a wider range of objects) and suggest new questions arising from the investigation.	controlled and why, in a variety of comparative and fair tests. • Recognise and independently control variables where necessary. • Decide how often to take a measurement • Talk about their degree of trust in the sources they used. • • Explain their degree of trust in their results (e.g. precision in measurements, variables that may not have been controlled, and accuracy of results.

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Examples of Scientific Enquiry

Skills progression

Working scientifically – enquiry types

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Comparative / fair test			Which surface produces the most friction?	How are the vibrations different when we change the volume or the drum?	Which materials will dissolve?	In what conditions does mould grow quickest?
Research	How can we compare animals?	How are materials recycled?	What are the advantages and disadvantages of exoskeletons and endoskeletons?	What causes a species to become endangered?	What can you find out about a specific planet in our solar system?	What are the different species of human evolution?
Observation over time	How do plants grow?	Which objects will biodegrade?	What affects how a plant grows?	How can temperature change the state of materials?	How can we separate mixtures? (evaporation)	How does mould grow and what impacts its speed?
Pattern seeking	Does the same thing happen to all trees in winter?	How do humans change as they grow?	How does the position of a light affect the size of a shadow?	What is a food chain?	How do babies grow and develop?	Do all drugs have the same impact on the body?
Identifying, grouping and classifying	What material are these objects made from?	How can we classify materials? How can we classify animals?	Which rocks are igneous, metamorphic, sedimentary?	What materials are conductors or insulators?	How can we compare materials? What are conductors and insulators?	Can you design a classification system for living things?
Problem solving	What is the weather like in autumn and winter?	Do older children have bigger feet? Why do we exercise?	What is the best material to use when designing a book bag?	What makes a creature adapted to its habitat?	What is the best material for a lunch bag? (insulators)	Can you apply your knowledge or reflection to investigate how light travels?

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