Working Scientifically Framework

			NC1	NC2	NC3	NC4	NC5	NC6
Before the Experiment	**Predict**		Show curiosity about what might happen.	Ask and answer simple questions about what might happen. Show understanding of "fair testing"	Starting to frame predictions in scientific language and concepts. Start to apply concepts of "fair testing".	Frame predictions in scientific language and concepts. Start to select information to inform predictions.	Draw on other evidence to inform their predictions. Start to refer to concepts like reliability, significance, replicability.	Predict, using evidence and with reference to concepts like reliability, significance, replicability.
	Plan		Make comments about what they are going to explore/investigate, in a context given to them.	Give a brief overview of their plans, in a context given to them, using some science vocabulary.	Verbally explain their plans, in a context given to them, using technical vocabulary and starting to link to different types of scientific enquiry.	Explain their plans in detail, verbally and in writing in a given context. Using technical vocabulary and linking to types of scientific enquiry. Start to link the planning and evaluation stages.	Plans make links to previous investigations, and consider the relative merits of different types of scientific enquiry in a given context.	Plan scientific enquiries to answer questions of their own, linking to what they have studied, and referring to previous and future investigations.
	Research		Children access simple books, websites, photos, videos and other sources that are given to them.	Start to select and use a range of books, websites, photos and other sources to learn about science.	Independently select and use sources to satisfy their curiosity about science.	Select and use sources to construct their own opinions about science. Start to explain usefulness and reliability.	Select, organise and use information from more than one source to construct an informed response and/or opinion. Explain the usefulness and reliability of different sources.	Thoughtfully select, organise and use relevant information from a range of sources to inform responses, justify their opinions, and politely point out the limitations of other people's ideas.
During the Experiment	**Observe**	**Take in information**	Begin to use first-hand observation using senses	Use first-hand observations with some simple equipment.	Use a range of observation equipment (ie: microscope, hand lens, data loggers)	Evaluate own observation and compare them with others.	Work collaboratively by building on others' observations	*This skill does not extend beyond NC5.*
		Using vocabulary	Use common words and phrases to talk about science	Use everyday words but in a more precise way; occasionally use scientific vocabulary.	Start choosing simple scientific vocabulary instead of everyday words	Use scientific vocabulary often and appropriately	Use scientific vocabulary, explaining how it differs from everyday usage, or from near-synonyms.	Start to apply vocabulary in sophisticated ways, for instance in different areas of science, or in other subjects.
		Asking questions	Ask and answer simple questions about what they have seen/heard	Show curiosity by voluntarily asking questions about what they have heard, read or observed.	Start to frame questions/answers in scientifically valid ways (ie: about change, differences)	Ask and answer scientifically valid questions	Ask/answer valid questions (e.g. significance, confidence, replicability)	Ask/answer perceptive questions. (ie: hypothetical, exploratory)
	Identify, classify and group		Make simple scientific comparisons (ie: spot the differences)	Identify differences and similarities in what they observe (perhaps with a given focus)	Start categorising Start to comment on scientific changes, including suggestions about cause and effect.	Categorise terms and observations Relate contrasts changes and trends to scientific content	Make more complex links between the differences and changes they see and the scientific content they have learnt.	Make links between what they see and a range of scientific content
	Measure		Measure to nearest 10cm (ie: with a meter ruler or a ruler in 5 cm blocks)	Measure to nearest cm	Start to take accurate measurements (eg: nearest mm, gram, degree) Use simple data-logging equipment	Make estimations and (with help) take systematic and careful measurements (e.g. clear clutter that might affect measurements) Use data loggers	Start to make comments about levels of accuracy (ie: not measuring longer distances in mm or cm) Take repeat readings if appropriate.	Understand and explain why different levels of accuracy are appropriate
	Record		Start to make simple recordings during the enquiry process (eg: lists, tallies)	Make more sophisticated recordings during the enquiry process (ie: frequency tables where the template is given)	Take simple notes and start to include scientific language. Use jotted tables and diagrams, subdivided lists, etc.	Take quantitative and qualitative notes that include scientific language Start to make simple calculations during the enquiry process	Make clear records of observations and other aspects of the enquiry process	Explain their choices about where, when and how to record an enquiry. Group and redraft into useful formats like tables, diagrams, flow-charts, etc.
After the Experiment	**Interpret and Conclude**		Using their observations and ideas to suggest answers to questions.	Answer questions about theri predictions and results	Start to link results to scientific language and subject knowledge Start to suggest further enquiry questions	Include comments about casual relationships and link these to scientific content	Justify their interpretations with evidence from their own inquiry but also external sources	Make comments about reliability of results, replicability, methodology Link their experience to a range of scientific content
	Evaluate		Make simple comments about their enquiry experience	Make comments about the method	Using technical vocabulary, make basic evaluations about their predictions (e.g. was it reasonable?) and methodology (e.g. was it difficult to measure)	Suggest improvements to their methodology, linking this to scientific knowledge	Start to organise evaluations (e.g. breaking them down into smaller steps)	Organise evaluations carefully, selecting by relevance and linking to scientific knowledge
	Present		Recount what they've seen or found, or draw a picture	Explain their findings verbally, through writing, and in age-appropriate graphic form (block diagrams, pictograms, tables)	Explaining observation, results and conclusions verbally and in writing and in age-appropriate graphic form (e.g. bar charts instead of blocks) Use IT to create more complex graphs (e.g. pie charts or line graphs)	Make selections to present relevant data, observations and conclusions in a variety of ways (e.g. slideshow, vlog, graphic formats) Use age-appropriate graph skills (e.g. discrete vs continuous data)	Include relevant background information and evaluation Use labelled diagrams, tables, classification keys, simple scatter graphs	Use a range of presentation forms to show discernment in selection, awareness of audience, and perceptie conclusions. Draw complex graphs by hand (e.g. pie charts, scatter/line graphs)