



THE ARUN VILLAGES FEDERATION

Enabling every child to thrive and succeed

Threshold Concepts Attainment Map in Working Scientifically

ELG: The Natural World Children at the expected level of development will: -

- Explore the natural world around them, making observations and drawing pictures of animals and plants; -
- 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; -
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

	EYFS	Year One	Year Two	End of KS1 expectations	Year Three	Year Four	End of Lower KS2 expectations	Year Five	Year Six	End of KS2 expectations
Plan	<p>Look for evidence of child's own understanding in their independent play, such as:</p> <ul style="list-style-type: none"> *How they communicate their understanding of their own and different environments. *How they show understanding of weather in their play. *Conversations as they play and explore outside. *Being able to explain similarities and differences. 	<ul style="list-style-type: none"> *Ask simple questions. *Offer possible answers. 	<ul style="list-style-type: none"> *Ask simple questions. *Recognise questions can be answered in different ways. *Carry out simple research with support. 	<p>Asking simple questions and recognising that they can be answered in different ways.</p>	<ul style="list-style-type: none"> *Ask relevant questions when prompted *Understand there are different types of scientific enquiry that can be used to answer questions. *Set up simple practical enquiries. *Set up comparative and fair tests with support. 	<ul style="list-style-type: none"> *Ask relevant questions. *Make independent decisions, using information and previous knowledge. *Use different types of scientific enquiries to answer their questions. *Set up simple and practical enquiries. *Begin to choose what observations to make and how long for. *Begin to choose what simple equipment to use. *Begin to use comparative and fair tests. *Recognise when a simple fair test is necessary. 	<p>Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests.</p>	<ul style="list-style-type: none"> *Plan different types of scientific enquiries to answer questions. *With prompting, recognise and control variables where necessary. *With prompting, select appropriate equipment to take readings. *When planning, begin to consider the need for repeat readings. *Explore and talk about own ideas, using these to raise questions about scientific phenomena. *With support, recognise that scientific ideas change and develop over time. 	<ul style="list-style-type: none"> *Independently plan different types of scientific enquiries to answer questions. *Decide if repeat readings are necessary for their enquiry and why. *Select appropriate equipment to take readings. *Recognise and control variables where necessary. *Explore and talk about own ideas, using these to raise questions about scientific phenomena. *Recognise that scientific ideas change and develop over time. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>



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Do	<ul style="list-style-type: none"> *Have hands on experiences to explore the natural world. *Observe and interact with natural processes e.g. ice melting, shadows, floating etc. *Throughout the year, go outside to observe the natural world, including animals. *Encourage children to observe how animals behave differently as the seasons change. *Understand the effect of changing seasons on the natural world around them. 	<ul style="list-style-type: none"> *Observe closely. *Begin to describe observations with support. *Use simple equipment. *Carry out simple tests with support. *Classify with support. *Identify with support. 	<ul style="list-style-type: none"> *Observe closely, using simple equipment independently. *Perform simple tests. *Identify with less support. *Classify with less support. 	<ul style="list-style-type: none"> Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. 	<ul style="list-style-type: none"> *Make systematic and careful observations. * Use simple Equipment. *Use standard units when taking measurements and begin to understand the need for accuracy. *Begin to use notes and tables when recording data. *Discuss criteria for grouping, sorting and classifying. 	<ul style="list-style-type: none"> *Make systematic and careful Observations. *Use a range of equipment, including thermometers and data loggers. *Take accurate measurements using standard units, where appropriate. *Use notes and tables when recording data. *Explain criteria for grouping, sorting and classifying. 	<ul style="list-style-type: none"> Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. 	<ul style="list-style-type: none"> *Use appropriate equipment to take accurate readings. *Take precise measurements using standard units. *With support, take repeat readings if appropriate. 	<ul style="list-style-type: none"> *Independently, use a range of scientific equipment to take measurements. *Independently, take measurements with increasing accuracy and precision. *Take repeat readings when appropriate. 	<ul style="list-style-type: none"> Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate



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Record	<ul style="list-style-type: none"> *Draw pictures of the natural world. *Opportunities to note and record the weather. *Model vocabulary to name specific features of the natural world, both natural and man-made. *Listen to children describe and comment on features outside. 	<ul style="list-style-type: none"> *Use simple scientific vocabulary. *Draw simple pictures of what they observe. *Begin to label pictures with support. 	<ul style="list-style-type: none"> *Record findings in a range of ways. *Gather and record data. *Communicate findings using simple scientific language. 	Gathering and recording data to help in answering questions.	<ul style="list-style-type: none"> *With modelling and guidance, gather, record, classify and present data in a variety of ways. *With support, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated. *Use simple scientific language when recording. 	<ul style="list-style-type: none"> *Gather and record data in a variety of ways. *Use simple scientific vocabulary when recording and presenting findings. *Record data using drawings, labelled diagrams, keys, tables and charts *Use bar charts to present findings, when appropriate. 	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	<ul style="list-style-type: none"> *Record data and results of increasing complexity. *Record data using labelled diagrams, keys, tables and charts. *Use bar and line graphs to record data. 	<ul style="list-style-type: none"> *Record data and results of increasing complexity. *Record data using scientific diagrams and labels, classification keys, tables and charts. *Use bar charts, line graphs and scatter graphs to record data. 	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs



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	EYFS	Year One	Year Two	End of KS1 expectations	Year Three	Year Four		Year Five	Year Six	End of KS2 expectations
Review	<ul style="list-style-type: none"> *Discuss how we care for the natural world around us. *Sing songs and join in with rhymes and poems about the natural world. *Share texts about changing seasons/weather. *Share non-fiction texts. 	<ul style="list-style-type: none"> *With support, use observations to suggest answers to simple questions. *Recognise and talk about their findings. *With support, begin to compare and group. 	<ul style="list-style-type: none"> *Use their observations and ideas to suggest answers to simple questions. * Use their observations and ideas to suggest next questions. *Consider the importance of their findings. *Make simple comparisons. *Use findings to support grouping. 	Using their observations and ideas to suggest answers to questions.	<ul style="list-style-type: none"> *With support, use data and observations from enquiries to answer questions. *Suggest conclusions from their enquiries. *With support, suggest how findings could be reported. *Suggest possible improvements to their approach. *Suggest further questions to investigate. *With support, begin to spot patterns. *With support, begin to identify differences, similarities or changes related to simple scientific ideas and processes. *With support, begin to use secondary sources to help answer questions that cannot be practically investigated. 	<ul style="list-style-type: none"> *Use data and observations from enquiries to answer questions. *Using results, draw simple conclusions. *With support, use results to predict further values within or beyond data collected. *Using results, make predictions for further investigations. *Use oral and written explanations of findings. *Create displays and/or presentations of results and conclusions. *Suggest possible improvements to their approach. *Suggest further questions to investigate. *Begin to look for naturally occurring patterns and relationships. *Identify differences, similarities or changes related to simple scientific ideas and processes. *Recognise and use secondary sources to help answer questions that cannot be practically investigated. 	<p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<ul style="list-style-type: none"> *With support, report and present findings from enquiries orally and in writing. *Using their data, suggest further comparative or fair tests. *Begin to explore causal relationships. *With support, consider the degree of trust in their results. *With support, identify scientific evidence that either supports or refutes their ideas. *With support, draw conclusions based on their data and observations and use evidence to justify these ideas. *Begin to use their scientific knowledge and understanding to explain findings. *Read, spell and pronounce scientific vocabulary correctly. 	<ul style="list-style-type: none"> *Report and present findings from their enquiries, including conclusions and causal relationships. *Report and present findings from their enquiries in oral and written forms such as displays and other presentations. *When reporting findings from enquiries, include explanations of and degree of trust in results. *Identify scientific evidence that has been used to support or refute their ideas or arguments. *Use test results to make predictions to set up further comparative and fair tests. *Use their scientific knowledge and understanding to explain findings. *Read, spell and pronounce scientific vocabulary correctly 	<p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>



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Science Skills Vocabulary - each year builds on from previous year. Highlighted is suggested Tier 3 Vocabulary

EYFS	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Explore, investigate, observe, look closely, watch, try, interact, similar, different, changes, patterns.	Question, answer, equipment, gather, measure, record, results, label, sort, group, test, explore, changes, observe, compare, describe, similar/similarities, different/differences, beaker, pipette, syringe, timer, magnifying glass, see, touch, feel, hear, smell, safety.	Previous vocab plus: observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, characteristics, data, comparison, importance, range, communicate/share, research, charts, conditions, number, type, accuracy, variety, stages, comparative, first-hand, suggestions, images.	Previous vocab plus: scientific enquiry, secondary sources, scientific ideas, scientific processes, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support, thermometers, microscope, various, present, factors, communicate, standard units, research notes, criteria, systematic, accuracy, comparison, relevant, source, practical, necessary, protect, behaviour.	Previous vocab plus: enquiry types, increase, decrease, order, notice patterns, relationships, appearance, present results, data loggers, labelled diagram, bar chart, naturally occurring, improvements, prediction, display, explain, necessary, category, models, effect, pictorial representation, precautions,	Previous vocab plus:, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, line graphs, opinions, fact, causal relationships, justify, support, refute, data loggers, repeat readings, scientific phenomena, developments over time, pertinent, timeline, qualitative, quantitative, guidelines, impact, calibrated, structure.	Previous vocab plus: opinion/fact, confidently name scientific enquiry types, scatter graphs, argument, construct, interpret, classification systems, broad, unfamiliar, scientists, scientific research, variation, specific, phenomena, component.

Suggestions of Tier 2 Vocabulary – some is linked to subject content.

EYFS	Year One	Year Two	Year Three	Year Four	Year Five	Year Six						
new	head	heard	young	force	fierce	bounce	ancestor	represent	achievement	hazy	constitute	range
little	grow	feet	feel	object	opposite	diagram	accelerate	threat	visible	detect	assign	component
same	plant	hear	body	surface	cling	resident	anticipate	fragile	independent	require	define	contribute
differ	food	wood	consider	dry	observe	digest	impact	disaster	identical	suspend	environment	layer
air	rock	order	family	shape	prepare	rare	essential	hostile	solar	astound	factor	react
why	tree		measure	heat	advantage	respect	variety	invisible	illuminate	rigorous	individual	sequence
change	hard		state	weight	frail	attract	dense	response	preserve	soar	method	cycle
light	press		produce		scatter	journey	deposit	assist	exert	retire	period	hypothesis
earth	night		wind		contain	coast	increase	lack	immense	perish	require	inhibit
light	life		question		launch	prevent	release	complete	altitude	occasion	structure	energy
animal	together		happen		glide	collect	indicate	possess	exhibit		affect	medical
try	fire		strong		examine	habitat	destructive		combine		category	modify
show	often		fact		suitable		typical		intercept		diverse	sustain



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Different types of questions based on Bloom's Taxonomy (Taken from 'Questioning Techniques in Primary Science', [ORBIT: The Open Resource Bank for Interactive Teaching.](#))

Type of question	Pupil response	Examples
Knowledge	Recalling facts, observations, meanings	Who? What? Where? When? Why? What does the word mean?
Comprehension	Summing up the main ideas, making connections, giving reasons, giving descriptions	What happened in our experiment? What do you notice? Does this remind you of anything? Why do you think this...happened? What's the main idea here?
Application	Applying techniques and rules to solve problems and to reach a desired outcome	What do you want to find out? You want to find out...so where are you going to start? You want to find out...so what have you tried? You want to find out...so what are you thinking of doing next?
Analysis	Identifying causes or motives Making inferences Finding evidences to support theories	Why did... happened? If you did... what do you think would happen? You think... can you test to see if it is true? What were you surprised about? What did you think when that happened?
Synthesis	Finding methods to solve problems Making predictions Producing original ideas, writing or artefacts	How can we solve...? How can we improve...? What will happen (now that...)? What do you predict would happen if...? What would you like to happen?
Evaluation	Giving opinions about issues Judging the validity of ideas Judging whether a method or solution could be improved Judging whether something fits the purpose Aesthetic judgements	Do you agree? Do you think that it is right to...? What is your opinion about...? Would it be better to do it another way? Does that work? Does that solve the problem completely? Do you like the look (or sound...) of that? How do you feel about...?