Wherwell Primary Progression of Enquiry Skills – Working Scientifically

Aims of the primary science curriculum - to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of scientific enquiries that help answer questions about the world
- are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future

The following are the essential enquiry skills needed for working scientifically across the primary curriculum. Note - pupils are NOT expected to cover each aspect for every area of study.

Asking questions						
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Question why things	Ask simple questions	Raise their own	Ask relevant	Question what they	Use existing	Observe & raise
happen	following	simple questions	questions about the	have observed in the	knowledge and	different scientific
	observations and	about what they	world around them	world around them	experience to ask	questions to explain
Ask questions about	exploration	notice from the	from observation &		different kinds of	new & familiar ideas
aspects of their		natural and humanly	exploration of the	Decide which type of	questions	
familiar world or	Ask people questions	constructed world	relationships between	enquiry would be the		Select, plan & report
the natural world	& use simple	around them, using	living things & their	best to provide	Select and plan the	different scientific
	secondary sources to	their understanding of	environment	answers to their	most appropriate type	enquiries to provide
Answer how and	find answers	scientific ideas		questions	of scientific enquiry to	answers to questions;
why questions			Begin to recognise		use to answer	use results to explore
about their	Begin to recognise	Ask key questions &	when & how	Use secondary	questions	further questions
experiences	the different ways in	use secondary	secondary sources	sources to answer		
	which they can	sources to find	may help answer	questions that cannot	Recognise which	Identify which
	answer scientific	answers	questions that cannot	be satisfied through	secondary sources will	secondary sources will
	questions: observing		be answered through	practical	be most useful to	be most useful &
	changes over time,	Recognise, discuss	practical	investigations	research ideas	separate opinion from
	noticing patterns,	and suggest ways to	investigations			fact
	grouping &	answer scientific		Use their findings to	Begin to separate	
	classifying, carrying	questions, using their	Begin to decide which	raise further	opinion from fact	Question scientific
	out simple	experience in Year 1	type of scientific	questions and suggest		ideas & arguments;
	comparative tests,	to choose the most	enquiry to use to	different ways in	Use results to suggest	raise questions to
	using secondary	appropriate methods	answer questions	which these could be	how new questions	support or refute
	sources			answered	could be answered to	these
			With support, identify		explore scientific	
			new questions arising		ideas	
			from enquiries			

Observing and measuring						
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Observe and	Observe and explore	Observe and explore	Observe and explore	Make systemic and	Observe scientific	Observe scientific
explore the world	the world around	the natural and	the world around	careful observations	phenomena and ideas	functions,
around them,	them	humanly constructed	them and broaden			relationships and
through play and		world around them	their scientific view	With help, make	Make their own	interactions more
senses	Observe closely using			decisions about what	decisions about what	systematically
	simple equipment	Observe changes over	Take accurate	observations to make,	observations to make	
Show curiosity		time	measurements in	how long to make		Take different
about objects,	With help, observe		standard units using a	them for and what	Decide which	measurements using a
events and people	changes over time	Use simple	range of equipment,	equipment should be	measurements to use	range of scientific
		measurements and	including	used	and for how long	equipment with
Make observations	Use simple	equipment to gather	thermometers and			increasing accuracy
of animals, plants	measurements and	data and carry out	data loggers	Take accurate	Identify the most	and precision and
and vehicles and	equipment (e.g. hand	simple tests		measurements using	appropriate	explain how to use it
what they do	lenses, egg timers) to		Begin to look for	standard units and	equipment to use and	
	gather data	Identify patterns and	naturally occurring	learn how to use new	explain why	Decide whether to
Choose resources		relationships within	patterns and	equipment		take repeated
they need for	With guidance, begin	data	relationships	appropriately	Look for different	measurements and
different activities	to notice patterns				causal relationships in	explain why
	and relationships			Identify patterns and	their data and identify	
Make links and				relationships and	evidence that refutes	Identify and discuss
notice patterns in				decide which data to	or supports their	different causal
their experiences				collect to identify	ideas	relationships in their
				them		data
						Identify scientific
						evidence that has
						been used to support
						or refute ideas and
						arguments
Planning and setting	up different types of end	uiries				
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Take risks and	Begin to recognise	Suggest ways in which	Start to make their	Decide which type of	Select and plan the	Identify, plan and set
engage in new	different ways in	they could find	own decisions about	enquiry would be best	most appropriate type	up different scientific
experiences, learn	which they might	answers to their	the most appropriate	to answer a question	of scientific enquiry to	enquiries to answer
by trial and error		questions	type of scientific		answer a question	questions

(playing and exploring) Find ways to solve problems Find new ways to do things	answer scientific questions Experience different types of scientific enquiries, including practical activities	Decide on the most appropriate enquiry to use and with support, explain their choice	enquiry they might use to answer questions Suggest alternatives and give reasons for choices With help, plan and set up an enquiry	and suggest reasons for their choice Plan and set up a scientific enquiry, with some support	Plan and set up an enquiry, recognising that there are variables which may or may not be controlled	Recognise and control variables within the enquiry
Identifying and classi	fying					
Year R Know about similarities and differences in relation to places, objects, materials and living things Develop ideas of grouping, sequences and cause and effect	Year 1 Use simple features to compare objects, materials and living things With help, decide how to sort and group them	Year 2 With help, use simple features to identify, compare and contrast objects, materials and living things Describe how and why they have grouped them	Year 3 Identify and classify objects, materials and living things according to their characteristics Talk about the criteria used for grouping With help, use and create simple keys	Year 4 Discuss and explain criteria for grouping, sorting and classifying objects, materials and living things based on their characteristics Use simple keys to identify and classify a variety of objects, materials and living things in their environment Suggest different ways in which things could be identified and grouped according to their characteristics or properties	Year 5 Use classification keys to identify and group objects, materials and living things according to their characteristics Give reasons for classifying plants and animals based on specific characteristics Develop simple classification keys Discuss and reason why living things are placed in one group and not another	Year 6 Use and develop keys and other information records to identify, classify and describe living things and materials Explain how keys enable scientists to identify patterns in the natural environment Explore the system of classification of all living things and how broad groupings can be sub-divided

Performing tests	Performing tests					
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Choose resources needed for chosen activities	Carry out simple tests, with support, using simple equipment	Carry out simple tests using a range of equipment	Perform simple practical enquiries, including comparative and fair tests	Set up and perform practical enquires, including comparative and fair tests Recognise when a simple fair test is necessary and how to set it up	Recognise when and how to set up and perform practical comparative and fair tests to support scientific enquiry Set up and perform a range of practical tests using suitable equipment Explain and identify the difference between fair and comparative tests	Set up and perform different practical tests with variables and constants Explain which variables need to be controlled and why Suggest the most suitable way to perform a test, recognising the need for it to be a fair test Identify when a test needs to be repeated and explain why
Gathering and record	ling data	Verr 2	Verr 2	Verr	Veer C	Voor
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Create simple representations of events, people and objects Draw pictures with simple labels to record findings from enquiries	With help, communicate findings from enquires in a variety of ways, including drawings, tables and charts, displays and simple writing (labels and short sentences)	Record simple data and observations gathered from enquiries with increasing accuracy in a variety of ways Begin to suggest ways in which data can be recorded	Record using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables Use oral and written explanations when recording findings	With support, make decisions about how to collect and report data in different ways Compare their recording with similar models and images Record data with increasing accuracy and scientific vocabulary	Record data and results of increasing complexity, with some support Use scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Look for different causal relationships in their data and identify evidence that refutes or supports their ideas Decide how to record data and results from a choice of familiar approaches and provide reasoned justification for their choice

Using Equipment						
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Handle tools and	Use simple	Use an increasing	Learn how to use new	Take accurate	Choose the most	Use a variety of
equipment	equipment to carry	range of simple	equipment to	measurements using	appropriate	equipment with
effectively and	out simple tests and	equipment	perform a range of	standard units	equipment for the	precision and
safely	gather data (hand	(microscopes, rain	tests and gather data		enquiry	accuracy to gather
	lenses, egg timers)	gauges) to perform	(data loggers,	Suggest the most		data during scientific
		tests and gather data	thermometers)	appropriate	Take measurements	enquiries
				equipment for the	accurately	
			Read and use	enquiry		Read a range of
			standard units when		Take repeat	standard units of
			measuring with		measurements where	measure and explain
			equipment		appropriate	how and why to use
						different equipment
Reporting, presenting	g and communicating da	ta/findings				
Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Develop own	Use their	With some support,	Use relevant, simple	Use mostly accurate	Use relevant scientific	Use relevant and
narratives and	observations and	record and	scientific language to	and relevant scientific	language &	accurate scientific
explanations by	ideas to suggest	communicate their	discuss ideas and	language when	illustrations to	language and
connecting ideas	answers to questions	findings in a range of	communicate their	communicating	discuss, communicate	illustrations when
and events		ways, using simple	findings	findings to different	& justify ideas	communicating with
	Begin to use simple	scientific language		audiences		different audiences
Speaking – build up	scientific language to		With support, present		Use oral & written	
vocabulary that	talk about their	Describe practical	ideas using oral and	Present findings in a	forms, displays &	Decide which form/s
reflects experiences	findings from first-	first-hand experiences	written explanations,	range of ways	other presentations	of presentation to use
and understanding	hand practical	and ideas	displays or		to report conclusions,	when reporting and
	experiences		presentations of	Identify new	causal relationships &	explain their choices
Answer how and		With support, ask	results and	questions and make	explanations of	
why questions	with help,	questions to explore	conclusions	predictions for new	degree of trust in	Ivlake key links
about their	communicate their	scientific ideas and	Mith and the transfer	values within or	results	between topics and
experiences	lueas and	the world crowned	with support, identify	beyond data collected	Lico roculto to make	reference the work of
	understanding in a	the world around	new questions arising	and suggest ways of	Use results to make	scientists and
	variety of ways	them	from their data and	improving practical	predictions & identify	scientific research in
observations			experiences	enquiries	when further	their communications
					observations,	where appropriate
					comparative & fair	
					tests might be needed	

Working Scientifically – key enquiry skills for pupils:

- Asking questions
- Observing and measuring
- Planning and setting up different types of enquiry
- Identifying and classifying
- Performing tests
- Gathering and recording data
- Using equipment
- Reporting, presenting and communicating data/findings

Summary of progression of skills by year group:

Year R

		AUTUMN	SPRING	SUMMER
Asking questions	Question why things happen			
	Ask questions about aspects of their familiar world or the natural world			
	Answer how and why questions about their experiences			
Observing and measuring	Observe and explore the world around them, through play and senses			
	Show curiosity about objects, events and people			
	Make observations of animals, plants and vehicles and what they do			
	Choose resources they need for different activities			
	Make links and notice patterns in their experiences			
Planning and setting up	Take risks and engage in new experiences, learn by trial and error (playing and			
different types of	exploring)			
enquiry	Find ways to solve problems			
	Find new ways to do things			
Identifying and	Know about similarities and differences in relation to places, objects, materials and			
classifying	living things			
	Develop ideas of grouping, sequences and cause and effect			
Performing tests	Choose resources needed for chosen activities			
Gathering and recording	Create simple representations of events, people and objects			
data	Draw pictures with simple labels to record findings from enquiries			
Using equipment	Handle tools and equipment effectively and safely			
Reporting, presenting	Develop own narratives and explanations by connecting ideas and events			
and communicating	Speaking – build up vocabulary that reflects experiences and understanding			
data/findings	Answer how and why questions about their experiences			
	Talk about their observations			

		AUTUMN	SPRING	SUMMER
Asking questions	Ask simple questions following observations and exploration			
	Ask people questions & use simple secondary sources to find answers			
	Begin to recognise the different ways in which they can answer scientific questions:			
	observing changes over time, noticing patterns, grouping & classifying, carrying out			
	simple comparative tests, using secondary sources			
Observing and measuring	Observe and explore the world around them			
	Observe closely using simple equipment			
	With help, observe changes over time			
	Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data			
	With guidance, begin to notice patterns and relationships			
Planning and setting up	Begin to recognise different ways in which they might answer scientific questions			
different types of	Experience different types of scientific enquiries, including practical activities			
enquiry				
Identifying and	Use simple features to compare objects, materials and living things			
classifying	With help, decide how to sort and group them			
Performing tests	Carry out simple tests, with support, using simple equipment			
Gathering and recording	With help, communicate findings from enquires in a variety of ways, including drawings,			
data	tables and charts, displays and simple writing (labels and short sentences)			
Using equipment	Use simple equipment to carry out simple tests and gather data (hand lenses, egg			
	timers)			
Reporting, presenting	Use their observations and ideas to suggest answers to questions			
and communicating	Begin to use simple scientific language to talk about their findings from first-hand			
data/findings	practical experiences			
	With help, communicate their ideas and understanding in a variety of ways			

		AUTUMN	SPRING	SUMMER
Asking questions	Raise their own simple questions about what they notice from the natural and humanly			
	constructed world around them, using their understanding of scientific ideas			
	Ask key questions & use secondary sources to find answers			
	Recognise, discuss and suggest ways to answer scientific questions, using their			
	experience in Year 1 to choose the most appropriate methods			
Observing and measuring	Observe and explore the natural and humanly constructed world around them			
	Observe changes over time			
	Use simple measurements and equipment to gather data and carry out simple tests			
	Identify patterns and relationships within data			
Planning and setting up	Suggest ways in which they could find answers to their questions			
different types of	Decide on the most appropriate enquiry to use and with support, explain their choice			
enquiry				
Identifying and	With help, use simple features to identify, compare and contrast objects, materials and			
classifying	living things			
	Describe how and why they have grouped them			
Performing tests	Carry out simple tests using a range of equipment			
Gathering and recording	Record simple data and observations gathered from enquiries with increasing accuracy			
data	in a variety of ways			
	Begin to suggest ways in which data can be recorded			
Using equipment	Use an increasing range of simple equipment (microscopes, rain gauges) to perform			
	tests and gather data			
Reporting, presenting	With some support, record and communicate their findings in a range of ways, using			
and communicating	simple scientific language			
data/findings	Describe practical first-hand experiences and ideas			
	With support, ask questions to explore scientific ideas and broaden their view of the			
	world around them			

		AUTUMN	SPRING	SUMMER
Asking questions	Ask relevant questions about the world around them from observation & exploration of			
	the relationships between living things & their environment			
	Begin to recognise when & how secondary sources may help answer questions that			
	cannot be answered through practical investigations			
	Begin to decide which type of scientific enquiry to use to answer questions			
	With support, identify new questions arising from enquiries			
Observing and measuring	Observe and explore the world around them and broaden their scientific view			
	Take accurate measurements in standard units using a range of equipment, including			
	thermometers and data loggers			
	Begin to look for naturally occurring patterns and relationships			
Planning and setting up	Start to make their own decisions about the most appropriate type of scientific enquiry			
different types of	they might use to answer questions			
enquiry	Suggest alternatives and give reasons for choices			
	With help, plan and set up an enquiry			
Identifying and	Identify and classify objects, materials and living things according to their characteristics			
classifying	Talk about the criteria used for grouping			
	With help, use and create simple keys			
Performing tests	Perform simple practical enquiries, including comparative and fair tests			
Gathering and recording	Record using simple scientific language, drawings, labelled diagrams, keys, bar charts			
data	and tables			
	Use oral and written explanations when recording findings			
Using equipment	Learn how to use new equipment to perform a range of tests and gather data (data			
	loggers, thermometers)			
	Read and use standard units when measuring with equipment			
Reporting, presenting	Use relevant, simple scientific language to discuss ideas and communicate their findings			
and communicating	With support, present ideas using oral and written explanations, displays or			
data/findings	presentations of results and conclusions			
	With support, identify new questions arising from their data and experiences			

		AUTUMN	SPRING	SUMMER
Asking questions	Question what they have observed in the world around them			
	Decide which type of enquiry would be the best to provide answers to their questions			
	Use secondary sources to answer questions that cannot be satisfied through practical			
	investigations			
	Use their findings to raise further questions and suggest different ways in which these			
	could be answered			
Observing and measuring	Make systemic and careful observations			
	With help, make decisions about what observations to make, how long to make them			
	for and what equipment should be used			
	Take accurate measurements using standard units and learn how to use new equipment			
	appropriately			
	Identify patterns and relationships and decide which data to collect to identify them			
Planning and setting up	Decide which type of enquiry would be best to answer a question			
different types of	and suggest reasons for their choice			
enquiry	Plan and set up a scientific enquiry, with some support			
Identifying and	Discuss and explain criteria for grouping, sorting and classifying objects, materials and			
classifying	living things based on their characteristics			
	Use simple keys to identify and classify a variety of objects, materials and living things in			
	their environment			
	Suggest different ways in which things could be identified and grouped according to			
	their characteristics or properties			
Performing tests	Set up and perform practical enquires, including comparative and fair tests			
	Recognise when a simple fair test is necessary and how to set it up			
Gathering and recording	With support, make decisions about how to collect and report data in different ways			
data	Compare their recording with similar models and images			
	Record data with increasing accuracy and scientific vocabulary			
Using equipment	Take accurate measurements using standard units			
	Suggest the most appropriate equipment for the enquiry			
Reporting, presenting	Use mostly accurate and relevant scientific language when communicating findings to			
and communicating	different audiences			
data/findings	Present findings in a range of ways			
	Identify new questions and make predictions for new values within or beyond data			
	collected and suggest ways of improving practical enquiries			

		AUTUMN	SPRING	SUMMER
Asking questions	Use existing knowledge and experience to ask different kinds of questions			
	Select and plan the most appropriate type of scientific enquiry to use to answer			
	questions			
	Recognise which secondary sources will be most useful to research ideas			
	Begin to separate opinion from fact			
	Use results to suggest how new questions could be answered to explore scientific ideas			
Observing and measuring	Observe scientific phenomena and ideas			
	Make their own decisions about what observations to make			
	Decide which measurements to use and for how long			
	Identify the most appropriate equipment to use and explain why			
	Look for different causal relationships in their data and identify evidence that refutes or			
	supports their ideas			
Planning and setting up	Select and plan the most appropriate type of scientific enquiry to answer a question			
different types of	Plan and set up an enquiry, recognising that there are variables which may or may not			
enquiry	be controlled			
Identifying and	Use classification keys to identify and group objects, materials and living things			
classifying	according to their characteristics			
	Give reasons for classifying plants and animals based on specific characteristics			
	Develop simple classification keys			
	Discuss and reason why living things are placed in one group and not another			
Performing tests	Recognise when and how to set up and perform practical comparative and fair tests to			
	support scientific enquiry			
	Set up and perform a range of practical tests using suitable equipment			
	Explain and identify the difference between fair and comparative tests			
Gathering and recording	Record data and results of increasing complexity, with some support			
data	Use scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line			
	graphs			
Using equipment	Choose the most appropriate equipment for the enquiry			
	Take measurements accurately			
	Take repeat measurements where appropriate			
Reporting, presenting	Use relevant scientific language & illustrations to discuss, communicate & justify ideas			
and communicating	Use oral & written forms, displays & other presentations to report conclusions, causal			
data/findings	relationships & explanations of degree of trust in results			
	Use results to make predictions & identify when further observations, comparative &			
	I fair tests might be needed			

		AUTUMN	SPRING	SUMMER
Asking questions	Observe & raise different scientific questions to explain new & familiar ideas			
	Select, plan & report different scientific enquiries to provide answers to questions;			
	use results to explore further questions			
	Identify which secondary sources will be most useful &			
	separate opinion from fact			
	Question scientific ideas & arguments; raise questions to support or refute these			
Observing and	Observe scientific functions, relationships and interactions more systematically			
measuring	Take different measurements using a range of scientific equipment with increasing accuracy and			
	precision and explain how to use it			
	Decide whether to take repeated measurements and explain why			
	Identify and discuss different causal relationships in their data			
	Identify scientific evidence that has been used to support or refute ideas and arguments			
Planning & setting up	Identify, plan and set up different scientific enquiries to answer questions			
different types of	Recognise and control variables within the enquiry			
enquiry				
Identifying and	Use and develop keys and other information records to identify, classify and describe living things and			
classifying	materials			
	Explain how keys enable scientists to identify patterns in the natural environment			
	Explore the system of classification of all living things and how broad groupings can be sub-divided			
Performing tests	Set up and perform different practical tests with variables and constants			
	Explain which variables need to be controlled and why			
	Suggest the most suitable way to perform a test, recognising the need for it to be a fair test			
	Identify when a test needs to be repeated and explain why			
Gathering and	Look for different causal relationships in their data and identify evidence that refutes or supports their			
recording data	ideas			
	Decide how to record data and results from a choice of familiar approaches and provide reasoned			
	justification for their choice			
Using equipment	Use a variety of equipment with precision and accuracy to gather data during scientific enquiries			
	Read a range of standard units of measure and explain how and why to use different equipment			
Reporting, presenting	Use relevant and accurate scientific language and illustrations when communicating with different			
& communicating	audiences			
data/findings	Decide which form/s of presentation to use when reporting and explain their choices			
	Make key links between topics and reference the work of scientists and scientific research in their			
	communications where appropriate			