

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

(playing and exploring)	answer scientific questions	Decide on the most appropriate enquiry to use and with support, explain their choice	enquiry they might use to answer questions	and suggest reasons for their choice	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
Find ways to solve problems	Experience different types of scientific enquiries, including practical activities		Suggest alternatives and give reasons for choices	Plan and set up a scientific enquiry, with some support		
Find new ways to do things			With help, plan and set up an enquiry			

Identifying and classifying

<i>Year R</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>
Know about similarities and differences in relation to places, objects, materials and living things	Use simple features to compare objects, materials and living things	With help, use simple features to identify, compare and contrast objects, materials and living things	Identify and classify objects, materials and living things according to their characteristics	Discuss and explain criteria for grouping, sorting and classifying objects, materials and living things based on their characteristics	Use classification keys to identify and group objects, materials and living things according to their characteristics	Use and develop keys and other information records to identify, classify and describe living things and materials
Develop ideas of grouping, sequences and cause and effect	With help, decide how to sort and group them	Describe how and why they have grouped them	Talk about the criteria used for grouping	Use simple keys to identify and classify a variety of objects, materials and living things in their environment	Give reasons for classifying plants and animals based on specific characteristics	Explain how keys enable scientists to identify patterns in the natural environment
			With help, use and create simple keys	Suggest different ways in which things could be identified and grouped according to their characteristics or properties	Develop simple classification keys	Explore the system of classification of all living things and how broad groupings can be sub-divided
					Discuss and reason why living things are placed in one group and not another	

Performing tests						
<i>Year R</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>
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 recording data						
<i>Year R</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>
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						
<i>Year R</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>
Handle tools and equipment effectively and safely	Use simple equipment to carry out simple tests and gather data (hand lenses, egg timers)	Use an increasing range of simple equipment (microscopes, rain gauges) to perform tests and gather data	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	Take accurate measurements using standard units Suggest the most appropriate equipment for the enquiry	Choose the most appropriate equipment for the enquiry Take measurements accurately Take repeat measurements where appropriate	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 and communicating data/findings						
<i>Year R</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>	<i>Year 6</i>
Develop own narratives and explanations by connecting ideas and events Speaking – build up vocabulary that reflects experiences and understanding Answer how and why questions about their experiences Talk about their observations	Use their observations and ideas to suggest answers to questions Begin to use simple scientific language to talk about their findings from first-hand practical experiences With help, communicate their ideas and understanding in a variety of ways	With some support, record and communicate their findings in a range of ways, using simple scientific language Describe practical first-hand experiences and ideas With support, ask questions to explore scientific ideas and broaden their view of the world around them	Use relevant, simple scientific language to discuss ideas and communicate their findings With support, present ideas using oral and written explanations, displays or presentations of results and conclusions With support, identify new questions arising from their data and experiences	Use mostly accurate and relevant scientific language when communicating findings to different audiences 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	Use relevant scientific language & illustrations to discuss, communicate & justify ideas Use oral & written forms, displays & other presentations to report conclusions, causal relationships & explanations of degree of trust in results Use results to make predictions & identify when further observations, comparative & fair tests might be needed	Use relevant and accurate scientific language and illustrations when communicating with different audiences 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

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 different types of enquiry	Take risks and engage in new experiences, learn by trial and error (playing and exploring) Find ways to solve problems Find new ways to do things			
Identifying and classifying	Know about similarities and differences in relation to places, objects, materials and living things Develop ideas of grouping, sequences and cause and effect			
Performing tests	Choose resources needed for chosen activities			
Gathering and recording data	Create simple representations of events, people and objects Draw pictures with simple labels to record findings from enquiries			
Using equipment	Handle tools and equipment effectively and safely			
Reporting, presenting and communicating data/findings	Develop own narratives and explanations by connecting ideas and events Speaking – build up vocabulary that reflects experiences and understanding Answer how and why questions about their experiences Talk about their observations			

Year 1

		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 different types of enquiry	Begin to recognise different ways in which they might answer scientific questions Experience different types of scientific enquiries, including practical activities			
Identifying and classifying	Use simple features to compare objects, materials and living things With help, decide how to sort and group them			
Performing tests	Carry out simple tests, with support, using simple equipment			
Gathering and recording data	With help, communicate findings from enquires in a variety of ways, including drawings, 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 and communicating data/findings	Use their observations and ideas to suggest answers to questions Begin to use simple scientific language to talk about their findings from first-hand practical experiences With help, communicate their ideas and understanding in a variety of ways			

Year 2

		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 different types of enquiry	Suggest ways in which they could find answers to their questions Decide on the most appropriate enquiry to use and with support, explain their choice			
Identifying and classifying	With help, use simple features to identify, compare and contrast objects, materials and living things Describe how and why they have grouped them			
Performing tests	Carry out simple tests using a range of equipment			
Gathering and recording data	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			
Using equipment	Use an increasing range of simple equipment (microscopes, rain gauges) to perform tests and gather data			
Reporting, presenting and communicating data/findings	With some support, record and communicate their findings in a range of ways, using simple scientific language Describe practical first-hand experiences and ideas With support, ask questions to explore scientific ideas and broaden their view of the world around them			

Year 3

		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 different types of enquiry	Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions Suggest alternatives and give reasons for choices With help, plan and set up an enquiry			
Identifying and classifying	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			
Performing tests	Perform simple practical enquiries, including comparative and fair tests			
Gathering and recording data	Record using simple scientific language, drawings, labelled diagrams, keys, bar charts 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 and communicating data/findings	Use relevant, simple scientific language to discuss ideas and communicate their findings With support, present ideas using oral and written explanations, displays or presentations of results and conclusions With support, identify new questions arising from their data and experiences			

Year 4

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

Year 5

		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 different types of enquiry	Select and plan the most appropriate type of scientific enquiry to answer a question Plan and set up an enquiry, recognising that there are variables which may or may not be controlled			
Identifying and classifying	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			
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 data	Record data and results of increasing complexity, with some support 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 and communicating data/findings	Use relevant scientific language & illustrations to discuss, communicate & justify ideas Use oral & written forms, displays & other presentations to report conclusions, causal relationships & explanations of degree of trust in results Use results to make predictions & identify when further observations, comparative & fair tests might be needed			

Year 6

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