



# The Wolds and Vale Federation



## Progression of Working Scientifically Key Skills in Science

Sort/group/compare/classify/identify

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>COEL:</u> Make choices and explore different resources and materials.</p> <p>Make independent choices - do things independently that they have been previously taught.</p> <p>Sort materials.</p> <p><u>Birth to three:</u> Explore materials with different properties.</p> <p>Notice differences between people.</p> <p><u>3 &amp; 4-year-olds:</u> Use all their senses in hands-on exploration of natural materials.</p> <p>Explore collections of materials with similar and/or different properties.</p> <p><u>Reception:</u> Recognise some environments that are different to the natural world around them.</p> <p><u>ELG:</u> Know some similarities and differences between the natural</p>	<p>Begin to compare and contrast (recognising how things are different and what makes them the same) including how some things change over different periods of time.</p> <p>Sort and classify according to chosen features/criteria and begin to talk about/explain how they know.</p> <p>With help, decide how to sort and group objects, materials or living things.</p> <p>Begin to name and identify a variety of common features and/or uses for objects, materials or living things.</p> <p>Name common examples and some common features.</p>	<p>Compare and contrast a variety of things (focusing on the similarities as well as the differences) including how different things change over different periods of time (objects, materials or living things)</p> <p>Sort and classify things according to a variety of different features (e.g. I know it is a living thing because it...and it...).</p> <p>Decide how to sort and group objects, materials or living things.</p> <p>Name and identify a variety of common features and/or uses for objects, materials or living things.</p> <p>Name and identify common examples and some common features.</p>	<p>Compare and contrast functions, diets, teeth, changes over time.</p> <p>Record similarities and differences.</p> <p>Decide ways and give reasons for sorting, grouping, classifying, identifying things/objects, living things, processes or events based on specific characteristics.</p>	<p>Make a simple guide to local living things.</p> <p>Use guides or simple keys to classify/identify (local small invertebrates).</p> <p>Use their observations to identify and classify.</p> <p>Record similarities, differences or changes related to simple scientific ideas or processes or more complex groups of objects/living things/events and begin to give reasons for these.</p>	<p>Compare and contrast things beyond their locality.</p> <p>Compare more complex processes, systems, functions (e.g. life cycles of different living things, organ systems of different animals).</p> <p>Suggest reasons for similarities and differences.</p>	<p>Compare and contrast things beyond their locality and analyse advantages/disadvantages, pros/cons of their findings.</p> <p>Use and develop classification systems, keys and other information records (databases) to classify or identify.</p> <p>Compare and contrast more complex processes, systems, functions (e.g. sexual and asexual reproduction)</p>

world around them and contrasting environments, drawing on their experiences and what has been read in class.

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## Research

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>COEL:</u> Bring their own interests and fascinations into early years settings.</p> <p>Know more, so feel confident about coming up with their own ideas and make more links between those ideas.</p> <p><u>Reception:</u> Engage in non-fiction books.</p> <p>Listen to and talk about selected non-fiction to develop a deep familiarity with new knowledge and vocabulary.</p> <p><u>ELG:</u> Offer explanations for why things might happen, making use of recently introduced vocabulary from non-fiction when appropriate.</p>	<p>As a group, find out about the work of famous scientists - historical and modern day.</p> <p>Begin to use simple secondary sources (such as books, photographs and videos) to find things out/find answers.</p> <p>Ask questions to find things out/find answers.</p>	<p>Find out about the work of famous scientists - historical and modern day.</p> <p>Use simple and appropriate secondary sources (such as books, photographs and videos) to find things out/find answers.</p> <p>Ask people questions.</p>	<p>Create/invent design something based on what they have found out applying both research and/or practical experiences.</p> <p>Find out about the work of famous scientists - historical and modern day.</p> <p>Finding things out using secondary sources of information.</p>	<p>Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</p> <p>Create/invent design something based on what they have found out applying both research and/or practical experiences.</p> <p>Find out about the work of famous scientists - historical and modern day.</p>	<p>Research the work of famous scientists - (historical and modern day) and use this to find out how scientific ideas have changed over time.</p> <p>Find things out using a wide range of secondary sources of information.</p>	<p>Research the work of famous scientists - historical and modern day and use this to find out how scientific ideas have changed over time and had an impact on our lives.</p> <p>Interview people to find out about information and collect data.</p> <p>Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.</p>

## Modelling

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
			<p>Act out something to represent something else about the world around us.</p>	<p>Make a visual representation or a model if something to represent something they have seen or a process that is difficult to see.</p> <p>Suggest their own ideas on a concept and compare these with models or images.</p>	<p>Create simple models to describe scientific ideas (e.g, circulatory system).</p> <p>Use simple models to describe scientific ideas (e.g. of movement of the Sun and Earth, solar system, shadow clocks, magnetic compasses for navigation).</p>	<p>Identify some positive and some limitations of models used to describe/explain scientific ideas.</p> <p>Use and make own versions of simple models to describe and explain scientific ideas (e.g. periscopes, simple lever, burglar alarm).</p>

Recording of 'explore/observe'

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>COEL:</u> Respond to new experiences that you bring to their attention.</p> <p><u>Birth to three:</u> Repeat actions that have an effect.</p> <p><u>3 &amp; 4-year-olds:</u> Talk about what they see, using a wide vocabulary.</p> <p><u>Reception:</u> Describe what they see, hear and feel whilst outside.</p> <p><u>ELG:</u> Begin to show accuracy and care when drawing.</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p>	<p>Investigate different ways to record and communicate their findings using simple scientific language.</p> <p>With help, begin to use their own ideas and observations to offer answers to questions.</p> <p>Talk about, observe and begin to describe simple processes/cycles with several steps e.g. growth cycle.</p> <p>Talk about changes over time. (seasonal change/growth)</p> <p>Represent things in the real world in a variety of ways.</p>	<p>Record and communicate their findings using simple scientific language.</p> <p>Use their own ideas and their observations to offer answers to questions.</p> <p>Observe and describe simple processes/cycles with several steps e.g. growth cycle, simple food chain, saying how living things depend on one another.</p> <p>Recognise and describe a series of changes over time (e.g. growth)</p> <p>Observe, record and make drawings to represent things in the real world with some accuracy.</p>	<p>Observe and record relationships between structure and function.</p> <p>Observe and record changes/stages over time.</p> <p>Explore/observe things in the local environment/real contexts and record observations.</p> <p>Record observations/explorations/processes using simple scientific language.</p>	<p>Suggest their own ideas on a concept and compare these with what they observe/find out.</p> <p>Develop simple descriptions from their observations using relevant scientific language to discuss their ideas.</p> <p>Observe and record relationships between structure and function.</p> <p>Observe and record changes/stages over time.</p> <p>Explore/observe things in the local environment/real contexts and record observations.</p>	<p>Read, spell and pronounce scientific vocabulary correctly.</p> <p>Use their developing scientific knowledge and understanding and relevant scientific language to discuss, communicate and explain their findings.</p> <p>Explore more abstract systems/functions/changes and record their understanding of these (e.g. circulatory system)</p> <p>Observe changes over different periods of time.</p>	<p>Encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.</p> <p>Use correct scientific knowledge and understanding and relevant scientific language to explain their findings and justify their scientific ideas.</p> <p>Explore more abstract systems/functions/changes/behaviours and record their understanding of these (e.g. the relationship between diet, exercise, drugs, lifestyle and health; evolutionary changes; burning, rusting; reflection and refraction of light; friction, air resistance, gravity)</p> <p>Read, spell and pronounce scientific vocabulary correctly.</p>

## Questioning

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>3 &amp; 4-year-olds:</u> Understand 'why' questions, like, "Why do you think the caterpillar got so fat?"</p> <p><u>Birth to three:</u> Make connections between the features of their family and other families.</p> <p><u>Reception:</u> Ask questions to find out more and to check they understand what has been said.</p> <p><u>ELG:</u> Listen attentively and respond to what they hear with relevant questions during whole class discussions and small group interactions.</p>	<p>With help/as a group, raise questions about their observations.</p>	<p>Raise their own questions based on or linked to things they have observed.</p>	<p>Explore their own ideas about 'what if...?' scenarios e.g. humans did not have skeletons.</p> <p>Begin to understand that some questions are testable/can be tested in the classroom and some cannot.</p> <p>Within a group suggest relevant questions about what they observe and about the world around them.</p>	<p>Choose/select a relevant question that can be answered (by research or experiment/test)</p> <p>Ask/raise their own relevant questions with increasing confidence and independence about what they observe and about the world around them.</p>	<p>Raise different kinds of questions.</p> <p>Refine a scientific question so that it can be investigated.</p> <p>Ask their own pertinent questions.</p>	<p>Recognise scientific questions that do not yet have definitive answers.</p> <p>Use observations/data gathered to construct a further (testable or research) question.</p> <p>Raise different kinds of questions.</p>

## Planning

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>COEL:</u> Plan and think ahead about how they will explore or play with objects.</p> <p>Guide their own thinking and actions by talking to themselves while playing.</p> <p>Make independent choices.</p> <p>Use a range of strategies to reach a goal they have set themselves.</p> <p><u>3 &amp; 4-year-olds:</u> Use talk to organise themselves and their play.</p> <p><u>Reception:</u> Use talk to organise thinking and activities, and to explain how things might work and why they happen.</p> <p><u>ELG:</u> Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary.</p>	<p>With support, help to set up a simple test.</p> <p>In a group, begin to offer suggestions as to how they might find answers to scientific questions.</p> <p>Listen to the suggestions of others.</p> <p>Experience different types of scientific enquiry to answer questions.</p>	<p>Set up a comparative test.</p> <p>In a group, choose/suggest ways in which they might answer scientific questions.</p> <p>Suggest a practical way to find answers to their questions and listen to the suggestions of others.</p> <p>Use different types of scientific enquiry to answer their own questions.</p>	<p>Help to decide about how to set up a simple fair test and begin to recognise when a test is not fair.</p> <p>As a group, begin to make some decisions about the best way of answering their questions.</p> <p>With support/as a group, set up simple practical enquiries including comparative and fair tests, e.g. make a choice from a list of at least one variable that needs to be kept the same when conducting a fair test.</p> <p>Find/suggest a way to compare things e.g. materials, magnets</p>	<p>Investigate the effect of something on something else.</p> <p>Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer scientific questions (is a fair test the best way to investigate their question)</p> <p>Recognise when a test is necessary.</p> <p>Carry out simple fair tests (with increasing confidence and make some of the planning decisions about what to change and measure/observe)</p>	<p>Explain which variables need to be controlled and why.</p> <p>Make most of the planning decisions and carry out fair tests.</p> <p>Recognise when it is appropriate to carry out a fair test and plan how to set it up.</p>	<p>Plan enquiries, including recognising and controlling variables where necessary.</p> <p>Select and plan the most appropriate type of science enquiry to use to answer scientific questions.</p>



## Equipment and measuring

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>3 &amp; 4-year-olds:</u> Make comparisons between objects relating to size, length, weight and capacity.</p> <p><u>Reception:</u> Compare length, weight and capacity.</p>	<p>Observe by measuring non-standard units.</p> <p>With help, use their senses, simple measurements and equipment to gather data.</p> <p>In a group, gather data to help in answering questions.</p>	<p>Observe more accurately by measuring non-standard and standard units.</p> <p>Use their senses, simple measurements and equipment to gather data with increasing independence.</p> <p>Gather data to help in answering questions.</p>	<p>Collect data from their own observations and measurements, using notes/simple tables/standard units.</p> <p>Help to make some decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p> <p>Make simple accurate measurements using whole number standard units, using a range of equipment.</p> <p>Gathering data in a variety of ways to help in answering questions.</p> <p>Learn how to use new equipment e.g. data loggers.</p> <p>Explore and observe with increased accuracy using a hand lens or microscope.</p>	<p>Begin to identify where patterns might be found and use this to begin to identify what data to collect.</p> <p>Make more of the decisions about what observations to make, how long to make them for and the type of equipment that might be used.</p> <p>Learn how to use new equipment, such as data loggers and measure temperature in degrees Celsius (<math>^{\circ}\text{C}</math>) using a thermometer.</p> <p>Understand precautions for working safely.</p> <p>Collect and record data from their own observations and measurements, using notes/simple tables/standard units, to help to make decisions.</p> <p>Make accurate measurements using standard units (and more complex units and parts of units) using a range of equipment.</p>	<p>Recording data and results of increasing complexity.</p> <p>Follow safety guidelines.</p> <p>Make their own decisions about what observations to make or measurements to use and how long to make them for (recognising the need for repeat readings on some occasions).</p> <p>Decide how to record data from a choice of familiar approaches.</p> <p>Choose the most appropriate equipment to make measurements.</p> <p>Explain how to use equipment accurately.</p>	<p>Recognise that data might be unreliable and describe how to make it more reliable.</p> <p>Make their own decisions about what measurements to take (and identify the ranges and intervals used).</p> <p>Take measurements, using a range of equipment, with increasing accuracy and precision.</p> <p>Choose and use the most appropriate equipment to support observation, make measurements, collect data.</p> <p>Record data and results of increasing complexity.</p> <p>Follow (and suggest) safety guidelines.</p>

## Communicating Recording

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><b>3 &amp; 4-year-olds:</b> Talk about what they see, using a wide range of vocabulary.</p> <p><b>Reception:</b> Describe what they see, hear and feel whilst outside.</p> <p><b>ELG:</b> Explore the natural world around them, making observations and drawing pictures of animals and plants.</p>	<p>Record and communicate their findings in a range of ways e.g. talk/discuss; write/describe; draw pictures; take photographs; video; make/construct tables and pictograms as a group and displays.</p> <p>Communicate their ideas to a range of audiences in a variety of ways.</p> <p>Use simple scientific language in their recording.</p> <p>Record simple data using prepared tables/charts.</p> <p>Record data to help in answering questions.</p>	<p>Record and communicate their findings in a range of ways with increasing independence e.g. talk/discuss; write/describe; draw pictures; take photographs; video; make/construct a variety of table, charts including simple bar charts produced as a group and displays.</p> <p>Make some choices on how to communicate their ideas to a range of audiences in a variety of ways.</p> <p>Use simple scientific language in their recording.</p> <p>Record simple data with some accuracy.</p> <p>Record data to help in answering questions.</p>	<p>Record and present findings using simple scientific language and vocabulary, including discussions, oral and written explanations, notes, annotated drawings, pictorial representations, labelled diagrams, simple tables, bar charts (using ranges and intervals chosen for them, displays or presentations.</p> <p>Record, classify and present data in a variety of ways to help in answering questions.</p> <p>Communicate their findings in ways that are appropriate for different audiences.</p>	<p>Record findings using simple scientific language and vocabulary, including discussions, oral and written explanations, notes, annotated drawings, pictorial representations, labelled diagrams, tables and bar charts (where intervals and ranges agreed through discussion), displays or presentations.</p> <p>Begin to select the most useful ways to record, classify and present data from a range of choices.</p> <p>Make decisions on how best to communicate their findings in ways that are appropriate for different audiences.</p>	<p>Record data and results of increasing complexity using tables, bar and line graphs, and models.</p> <p>Report findings from enquiries using discussion, drawings (annotated), oral and written explanations of results, and conclusions.</p> <p>Present findings in written form, displays and other presentations.</p>	<p>Make decisions on the most appropriate format to present scientific data.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models.</p> <p>Report findings from enquiries using discussion, drawings (annotated), oral and written explanations of results, explanations involving causal relationships, and conclusions.</p> <p>Present findings in written form, displays and other presentations.</p>

Describe results

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p>COEL: Realise their actions have an effect on the world, so they want to keep repeating them.</p> <p><u>3 &amp; 4-year-olds:</u> Talk about what they see, using a wide vocabulary.</p> <p>Explore and talk about different force they can feel.</p> <p>Talk about the differences between materials and changes they notice.</p> <p><u>Reception:</u> Describe events in some detail.</p>	<p>With guidance, begin to notice simple patterns.</p> <p>Begin to order their findings.</p> <p>Recognise if their prediction was accurate.</p> <p>Talk about what they have seen/what has happened.</p>	<p>With guidance, begin to notice patterns and relationships.</p> <p>Order their findings</p> <p>Recognise if results matched predictions.</p> <p>Talk/discuss/describe with some accuracy what they have seen/what has happened.</p>	<p>Describe and compare the effect of different factors on something.</p> <p>With help, look for changes and patterns in their observations and data.</p> <p>Use their results to consider whether they meet predictions.</p>	<p>Notice/find patterns in their observations and data.</p> <p>Describe the effect of something/different factors on something else.</p> <p>Help to make decisions about how to analyse their data.</p>	<p>Identify patterns that might be found in the natural environment.</p> <p>Look for patterns and notice relationships between things and describe these.</p>	<p>Look for different causal (cause and effect) relationships in their data (something affecting something else) and describe the pattern succinctly.</p> <p>Identify patterns that might be found in the natural environment over long periods of time and describe how these have been used to develop scientific theories (e.g. evolution)</p>

## Explain results

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><b>3 &amp; 4-year-olds:</b> Be able to express a point of view and to debate when they disagree with an adult or a friend, using words as well as actions.</p> <p><b>Reception:</b> Articulate their ideas in well-formed sentences.</p> <p><b>ELG:</b> Offer explanations for why things might happen, making use of recently introduced vocabulary when appropriate.</p>	<p>Begin to suggest how and/or why things happen.</p> <p>With help, use their results and own experiences to answer questions.</p> <p>Begin to use simple scientific language to share their findings.</p> <p>With support, read and spell some scientific vocabulary.</p>	<p>Begin to explain how they know using the word 'because' and suggest how and/or why things happen.</p> <p>Draw on and use their results and own experiences to answer their questions.</p> <p>Begin to use simple scientific language to describe or explain what they have found out.</p> <p>Read and spell scientific vocabulary.</p>	<p>Read and spell scientific vocabulary correctly and with confidence.</p> <p>Use their own experience and some evidence or results to draw simple conclusions and answer questions.</p> <p>Talk about and record their findings using simple scientific language.</p> <p>Explain why things have happened.</p>	<p>Begin to develop their ideas about relationships and interactions.</p> <p>Reporting on findings from enquiries (beginning to identify the scientific facts in their data).</p> <p>Use relevant scientific language to discuss, communicate, report their findings.</p> <p>Read and spell scientific vocabulary correctly and with confidence.</p>	<p>Use their developing scientific knowledge and understanding and relevant scientific language to explain their findings.</p> <p>Draw conclusions based on their data and observations.</p> <p>Read and spell scientific vocabulary correctly and with confidence.</p>	<p>Identify evidence that refutes or supports their ideas.</p> <p>Use their evidence to justify their ideas.</p> <p>Use correct scientific knowledge and understanding and relevant scientific language to explain their findings.</p> <p>Read, spell and pronounce scientific vocabulary correctly.</p>

## Trusting my results

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
			<p>Say whether what happened was what they expected and notice any odd results that seem odd.</p> <p>Begin to recognise when a test is not fair and suggest improvements.</p>	<p>Use results to suggest improvements, new questions and predictions for setting up further tests.</p> <p>With help, pupils should look for similarities and differences in their data (between different groups of results).</p>	<p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>Comment on how reliable their data is.</p>	<p>Use their results to identify when further comparative tests and observations might be needed.</p> <p>Be able to explain differences in repeated measurements/readings or unexpected results.</p> <p>Recognise the limitations of some data.</p>

## Collaborating

<u>EYFS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p><u>3 &amp; 4-year-olds:</u> Start a conversation with an adult or a friend and continue it for many turns.</p> <p>Use talk to organise themselves.</p> <p><u>Reception:</u> Understand how to listen carefully and why listening is important.</p> <p><u>ELG:</u> Listen attentively and respond to what they hear with relevant questions, comments and actions during whole class discussions and small group interactions.</p>	<p>Listen to the suggestions of others when working in a group.</p>	<p>Listen to the suggestions of others.</p>	<p>Act out something to represent something else about the world around us.</p>	<p>Make a visual representation or a model if something to represent something they have seen or a process that is difficult to see.</p> <p>Suggest their own ideas on a concept and compare these with models or images.</p>		