



St Peter's C of E Primary School
Science Progression

'Let Your Light Shine'

Matthew 5:16

Science Progression in Securing Understanding

	Communicating Outcomes	Observing and Describing	Explaining Ideas	Using and Applying Subject knowledge, Understanding and Skills
EYFS	Children may use drawings (talk about them / annotated by an adult) Photographs (talk about them / annotated by an adult)	Children may talk about or draw what they have seen		
Year 1	Children use simple, limited vocabulary to talk about what they see, do or experience. They communicate their understanding in a variety of ways, including creating annotated drawings.	They make simple observations of what happens as they explore and investigate.	When prompted to think further about what and why, they can sometimes give a simple explanation of what has happened.	They respond to first hand, direct, practical experiences but struggle to relate to an unfamiliar or unusual context.
Year 2	Children use a wider variety of vocabulary to describe what they see and do and to name, for example, plants, animals and materials they encounter in the world around them.	With support from an adult, they are able to link cause and effect as they make observations. For example, they notice when prompted that, 'when we heated chocolate buttons they melted', when we baked the bread the dough changed'.	In response to prompting, they say why they think something has happened. Their explanations sometimes reflect their developing subject knowledge.	With support, they make links between first hand experiences and new learning in more unfamiliar or unusual contexts.

Year 3	Children use more complex vocabulary to communicate their thinking about what they see and do. Their responses may be oral or formally recorded and extend beyond a single sentence. They sometimes link to emerging ideas based on their classroom based or other learning.	They link cause and effect when describing their observations. For example, stating that, 'when we heated the chocolate it changed from a solid to a liquid and melted. If we put it in the fridge or leave it, it will go hard again'.	They sometimes explain why they think things have happened. These explanations are sometimes linked to subject knowledge and understanding and referenced to real world experiences.	They can use and apply skill, knowledge and understanding in unusual and challenging contexts, for example, creating a diet for an athlete or a trainer for a particular sport.
Year 4	Children use a wide variety of specific vocabulary to communicate their thinking and explain knowledge and understanding both orally and in writing. Their responses are more extended and link to emerging ideas based on classroom or other learning.	They link cause and effect when describing their observations, but go a little deeper. For example, stating that, 'when we heated the chocolate it melted and became liquid. If we put it in the fridge or leave it, will go hard again, but it won't be the same shape, unless we use a mould'.	They explain, why they think something might have happened, a piece of subject knowledge or a technical term. Explanations are often linked to their growing subject knowledge and include specific examples to add appropriate detail.	They make links between classroom based learning in science and science in the real world. They recognise the relevance of science in a variety of contexts, for example, for builders building an extension to the school, in designing a wildlife garden for the grounds, or for a local farmer looking after his crops.
Year 5	Children choose the most appropriate scientific language to use to communicate their ideas about processes or phenomena to a given audience, using writing or other means of communicating, as appropriate.	They make sets of observations or measurements as necessary. For example, they describe how a complex mixture of materials might be separated identifying a sequence of steps to separate each element of the mixture and using key vocabulary to describe the processes involved.	They relate their explanations of patterns in results to scientific knowledge and understanding and make generalisations about what the evidence they have gathered might indicate.	They recognise what they know understand or are able to do that might help them in tackling a problem or answering a question in an unfamiliar context. They identify applications of specific scientific ideas in the real world, using their knowledge and understanding of science ideas to help them.
Year 6	Children use appropriate scientific and mathematical conventions and terminology to communicate more abstract ideas in science. They select an appropriate writing genre to communicate in written form. They use a variety of other means of communication to provide an appropriate response for a given audience.	They describe a complex sequence of steps within a scientific process, for example the water cycle, or a life cycle, using specific scientific vocabulary to add detail. When describing observations or measurements they generalise based upon the range of data, communicating succinctly a trend or pattern they have identified.	They provide detailed explanations, clearly referenced to their subject knowledge and understanding, e.g. for differences and anomalies in repeated observations or measurements.	They link applications of science or technology to their underpinning scientific ideas and can explain in detail their relevance to a particular context. For example, they use their knowledge of separating mixtures to accurately describe the process as it is used in everyday life, e.g. in a coffee filter, swimming pool or sewage works.

Science Progression in Working Scientifically Skills

Asking Questions		Observing and Measuring		
Planning and setting up different types of enquiries Performing tests Using equipment		Identifying and classifying Gathering and Recording Data Reporting, presenting and communicating data/findings		
EYFS	KS1	LKS2	UKS2	KS3
Show curiosity about objects, events and people Playing & Exploring Questions why things happen Speaking: 30-50 months	Explore the world around them and raise their own simple questions	Raise their own relevant questions about the world around them	Use their science experience to explore ideas and raise different kinds of questions	Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
Engage in open-ended activity Playing & Exploring	Experience different types of science enquiries, including practical activities	Should be given a range of scientific experiences including different types of science enquiries to answer questions	Talk about how scientific ideas have developed over time	Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
Take a risk, engage in new experiences and learn by trial and error Playing & Exploring	Begin to recognise different ways in which they might answer scientific questions	Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions	Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variable, where appropriate
Find ways to solve problems/find new ways to do things/test their ideas Creating and Thinking Critically	Carry out simple tests	Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up	Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why	

Develop ideas of grouping, sequences, cause and effect Creating and Thinking Critically know about similarities and differences in relation to places, objects, materials and living things. ELG: The World	Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)	Talk about criteria for grouping, sorting and classifying and use simple keys	Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment	
Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world, The World: 30-50 months	Ask people questions and use simple secondary sources to find answers	Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	Recognise which secondary sources will be most useful to research their ideas and begin to separate opinions from fact	
Closely observes what animals, people and vehicles do, The World: 8-20 months Use senses to explore the world around them Playing and Exploring	Observe closely using simple equipment With help, observe changes over time	Make systematic and careful observations Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	Make their own decisions about what observations to make, what measurements to use and how long to make them for	Understand and use SI units and IUPAC chemical nomenclature Make and record observations and measurements using a range of methods for different investigations Present observations and data using appropriate methods, including tables and graphs
Make links and notice patterns in their experience Creating and Thinking Critically	With guidance, they should begin to notice patterns and relationships	Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them	Look for different causal relationships in their data and identify evidence that refutes or supports their ideas	Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

Choose the resources they need for their chosen activities LG: Self Confidence and Self-Awareness Handle equipment and tools effectively ELG: Moving and Handling	Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data	Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers/thermometers appropriately	Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate	Use appropriate techniques, apparatus and materials during fieldwork and laboratory work, paying attention to health and safety Evaluate the reliability of methods and suggest possible improvements Evaluate risks Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
Create simple representations of events, people and objects, Being Imaginative: 40-60 + months	Record simple data	Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Understand and use SI units and IUPAC chemical nomenclature Make and record observations and measurements using a range of methods for different investigations Present observations and data using appropriate methods, including tables and graphs
Answer how and why questions about their experiences ELG: Understanding Make observations of animals and plants and explain why some things occur, and talk about changes, ELG: The World	Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out	With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	Identify scientific evidence that has been used to support or refute ideas or arguments	Present reasoned explanations, including explaining data in relation to predictions and hypotheses Evaluate data, showing awareness of potential sources of random and systematic error

<p>Develop their own narratives and explanations by connecting ideas or events, ELG: Speaking Builds up vocabulary that reflects the breadth of their experience, Understanding: 30-50 months</p>	<p>With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language</p>	<p>Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions</p>	<p>Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results</p>	
		<p>With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.</p>	<p>Use their results to make predictions and identify when further observations, comparative and fair tests might be needed</p>	<p>Identify further questions arising from their results</p>

Science Progression in Subject Knowledge - Biology

	Animals (Including Humans)	Plants	All Living Things (Including Evolution and Inheritance)
EYFS	Make observations of animals, explain why some things occur and talk about changes	Make observations of plants, explain why some things occur and talk about changes	Know about similarities and differences in relation to living things Talk about the features of their own immediate environment and how environments might vary from one another
Year 1	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees	
Year 2	Notice that animals, including humans have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food, air) Describe the importance for humans of exercise, eating the right amounts of different types food and hygiene	Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Explore and compare the differences between things that are living, dead and things that have never been alive Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Identify and name a variety of plants and animals in their habitats – including microhabitats Describe how animals obtain their food from plants and other animals using the idea of a simple food chain – identify and name different sources of food
Year 3	Identify that animals, including humans, need the right types and amount of nutrition and that they cannot make their own food – they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	

Year 4	<p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p>		<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>
Year 5	<p>Describe the changes as humans develop to old age</p>		<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life processes of reproduction in some plants and animals</p>
Year 6	<p>Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p>		<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment and that adaptations lead to evolution</p>

Science Progression in Subject Knowledge - Chemistry

Materials: *Including: Everyday uses of materials, Rocks, Properties and changes, States of matter*

EYFS	Know about similarities and differences in relation to materials and objects
Year 1	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties
Year 2	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
Year 3	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter
Year 4	Compare and group materials together according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled: measure or research the temperature at which this happens in degrees C (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
Year 5	Compare and group everyday materials based on their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism Know some materials dissolve in liquid to form a solution and describe how to recover a substance from solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials and that these changes are not usually reversible eg: changes from burning or the action of acid on bicarbonate of soda
Year 6	

Science Progression in Subject Knowledge - Physics

	Light	Forces and Magnets	Sound	Electricity	Earth and Space
EYF					
Year 1			Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.		Observe change across the four seasons. Observe and describe weather associated with the seasons and how day length varies
Year 2					

Year 3

Recognise that light is needed in order to see things and that dark is the absence of light
Notice that light is reflected from surfaces
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
Recognise that shadows are formed when the light from a light source is blocked by an opaque object
Find patterns in the way that the size of shadows change

Compare how things move on different surfaces
Notice that some forces need contact between two objects, but magnetic forces can act at a distance
Observe how magnets attract or repel each other and attract some materials and not others
Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials
Describe magnets as having two poles
Predict whether two magnets will attract or repel each other depending on which poles are facing

Year 4			<p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit identifying and naming its basic parts including cells, wires, bulbs, switches and buzzers</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors</p>	
Year 5		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>			<p>Describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>Describe the movement of the moon relative to the Earth</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>

Year 6

Recognise that light appears to travel in straight lines
Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
Use recognised symbols when representing a simple circuit in a diagram