



# St Francis' Catholic Primary School – Working Scientifically Curriculum Progression





## Science Intent

Science provides the foundation for understanding the world around us. Engaging children's natural curiosity, imagination and excitement; science enables children to explore, learn and make sense of the world they live in. Our creative science curriculum will enable children to gain positive attitudes towards scientific knowledge and investigative processes; to understand both the uses and implications of science today, and in the future.








**EYFS –see Development Matters 2021 for detailed examples of how to support learning in EYFS**

**Understanding the world** involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

### 0-3 YEARS

-  Explore materials with different properties. Explore natural materials, indoors and outside.
-  Explore and respond to different natural phenomena in their setting and on trips.
-  Make connections between the features of their family and other families.
-  Notice differences between people.

### 3-4 YEARS

-  Use all their senses in hands-on exploration of natural materials.
-  Explore collections of materials with similar and/or different properties.
-  Talk about what they see, using a wide vocabulary
-  Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal.
-  Begin to understand the need to respect and care for the natural environment and all living things.
-  Explore and talk about different forces they can feel.
-  Talk about the differences between materials and changes they notice.

### RECEPTION

Understand the effect of changing seasons on the natural world around them.

Describe what they see, hear and feel whilst outside.

Understand the effect of changing seasons on the natural world around them.

#### The Natural World ELG

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

### Area of Study

#### Year 1

#### Year 2

#### Year 3

#### Year 4

#### Year 5

#### Year 6

#### National Curriculum

##### Pupils should be taught to:




- Asking simple questions and recognising that they can be answered in different ways




#### National Curriculum.




##### Pupils should be taught to:



















- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary


### Asking Questions

-  Explore the world around them and raise their own simple questions
-  Start to ask questions about the world around them
-  Responds to suggestions with own ideas

-  Raise their own relevant questions about the world around them
-  Should be given a range of scientific experiences including different types of science enquiries to answer questions
-  Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions

-  Use their science experiences to explore ideas and raise different kinds of questions
-  Talk about how scientific ideas have developed over time
-  Make links between concepts

Observing	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"> <li>- Observing closely, using simple equipment</li> </ul>	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"> <li>- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> </ul>	
	<ul style="list-style-type: none"> <li> With guidance, they should begin to notice patterns and relationships</li> <li> Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)</li> <li> Observe closely using simple equipment with help, observe changes over time</li> </ul>	<ul style="list-style-type: none"> <li> Make systematic and careful observations</li> <li> 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</li> <li> Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them</li> <li> Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately</li> <li> 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</li> </ul>	<ul style="list-style-type: none"> <li> 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</li> <li> Make a series of observations and measurements and vary one factor while keeping others the same.</li> <li> Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.</li> </ul>
Investigate	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"> <li>- Performing simple tests</li> </ul>	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"> <li>- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ↓ identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	
	<ul style="list-style-type: none"> <li> Experience different types of science enquiries, including practical activities</li> <li> Begin to recognise different ways in which they might answer scientific questions</li> <li> Carry out simple tests</li> </ul>	<ul style="list-style-type: none"> <li> Set up simple practical enquiries, comparative and fair test</li> <li> Recognise when a simple fair test is necessary and help to decide how to set it up</li> </ul>	<ul style="list-style-type: none"> <li> Decide on an appropriate approach, including using a fair test to answer a question.</li> <li> Select suitable equipment and information from that provided.</li> </ul>

	<ul style="list-style-type: none"><li> Follow instructions safely</li><li> Ask people questions and use simple secondary sources to find answers</li><li> Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data</li></ul>	<ul style="list-style-type: none"><li> Talk about criteria for grouping, sorting and classifying; and use simple keys</li><li> Recognise when and how secondary sources (books, internet) might help them to answer questions that cannot be answered through practical investigations</li><li> I carry out fair tests with some help, recognising and explaining what makes them fair.</li></ul>	<ul style="list-style-type: none"><li> Select and use methods that are adequate for the task.</li><li> 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</li><li> Following instructions, taking action to control obvious risks to themselves.</li><li> Select and use methods to obtain data systematically.</li><li> Recognise hazard symbols and make, and act on, simple suggestions to control obvious risks to themselves and others.</li></ul>			
Evaluate and Explain	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"><li>- Using their observations and ideas to suggest answers to questions</li><li>- Gathering and recording data to help in answering questions.</li></ul>	<b>National Curriculum</b> <b>Pupils should be taught to:</b> <ul style="list-style-type: none"><li>- Using test results to make predictions to set up further comparative and fair tests</li></ul>				
	<ul style="list-style-type: none"><li> Record simple data</li><li> Use their observations and ideas to suggest answers to questions</li><li> Talk about what they have found out and how they found it out</li><li> Use drawings and charts to show their findings</li><li> With guidance they can use scientific language to explain their findings</li><li> Say whether what happened was what the expected.</li></ul>	<ul style="list-style-type: none"><li> With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions</li><li> 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</li><li> 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.</li><li> Suggest improvements to their work.</li></ul>	<ul style="list-style-type: none"><li> communicate conclusions using appropriate scientific language</li><li> Identify scientific evidence that has been used to support or refute ideas or arguments</li><li> Interpret data containing positive and negative numbers.</li><li> Begin to relate conclusions to patterns in data, including graphs, and to scientific knowledge and understanding.</li><li> Analyse findings to draw scientific conclusions that are consistent with the evidence.</li><li> Communicate these using scientific and mathematical conventions and terminology</li><li> Suggest improvements to work, giving reasons.</li><li> Evaluate their working methods to make practical suggestions for improvements.</li><li> Reflect on their results and consider whether they are valid</li></ul>			
<div><div>Key Vocabulary Recommended by The Association for Science Education</div></div>						
TOPICS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area As for above plus - light, shade, sun, warm, cool, water, grow, healthy. Names of garden and wild flowering plants in the local area		Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal			

<b>Animals Including Humans</b>	<p>Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves</p> <p>Names of animals experienced first-hand from each vertebrate group.</p> <p>Parts of the body including those linked to PSHE teaching</p> <p>Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p> <p>Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult,)</p> <p>exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)</p>	<p>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints</p> <p>Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain</p>	<p>This needs to be taught alongside PSHE</p> <p>Puberty: the vocabulary to describe sexual characteristics</p> <p>Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle</p>
<b>(Uses of) Everyday Materials</b>	<p>Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through transparent and translucent, reflective, non- reflective, flexible, rigid Shape, push/pushing, pull/puling, twist/twisting, squash/squashing. bend/bending, stretch/stretching</p>		<p>Reversible, irreversible, hardness, solubility, transparency, conductivity, electrical, thermal, dissolve, solution, solids, liquids, gases, filtering, sieving, evaporating,</p>
<b>Seasonal Change</b>	<p>Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length</p>		
<b>Living things and their habitats</b>	<p>Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.</p>	<p>Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate</p>	<p>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</p> <p>Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non- flowering</p>
<b>Rocks</b>		<p>Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil</p>	

<b>Light &amp; Sound</b>		Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	As for year 3/4 plus straight lines, light rays.
<b>Forces and Magnets</b>		Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	Force, gravity, Earth, air resistance, water resistance friction, mechanisms, simple machines, levers, pulleys, gears
<b>States of matter / Properties and changes of materials</b>		Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non- reversible change, burning, rusting, new material
<b>Electricity</b>		Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in year3/ 4 do not need to use standard symbols as this is taught in year 5/6	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells and batteries are now used interchangeably
<b>Earth and Space</b>			Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets
<b>Evolution and Inheritance</b>			Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils