

**“The important thing is to never stop questioning.” Albert Einstein**



**ST JOHN'S**  
A PRIORY ACADEMY



THE  
**PRIORY**  
FEDERATION  
OF ACADEMIES TRUST

# Science Curriculum Overview

# Science at St John's

**Our Science curriculum ensures children are able to access a high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics.**

- Through the teaching of chemistry, physics and biology, our aim is for children to become confident investigators who can apply their knowledge and skills to further deepen their knowledge.
- We want all children to develop their curiosity, observation, questioning and reasoning skills through carefully investigating problems which are both child initiated, and teacher led to promote a positive attitude towards science. As they develop their own interest in science, a sense of awe and wonder will inspire children's own curiosity about the world around them.
- Alongside building up a body of key foundational knowledge, children will be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes using a range of approaches which are carefully scaffolded to include all learners.
- Our pupils are provided with real life investigations and experience aspects of local, national and global science as part of a broad and balanced curriculum. These are simultaneously developed alongside the St John's values of kindness and respect for the world around us, British values and protected characteristics.
- By the end of the primary phase, children will have acquired the skills and knowledge required to progress successfully into Key Stage 3.

## **Curriculum Drivers**

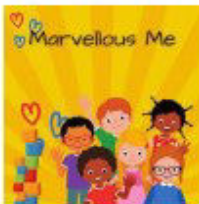







# Long Term Overview of Science Curriculum

Year Group	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
<b>Year 1</b>	Working Scientifically Seasonal Change	Working Scientifically Human Body and Sense	Working Scientifically Naming and Describing Materials	Working Scientifically Properties and use of materials	Working Scientifically Animals	Working Scientifically Identifying Plants and their parts
<b>Year 2</b>	Working Scientifically Local Habitats	Working Scientifically Choosing Materials	Working Scientifically Growing Seeds and Bulbs	Working Scientifically Growing up (Animals and Humans)	Working Scientifically Changing Materials	Working Scientifically Growing Healthy Plants
<b>Year 3</b>	Working Scientifically Rocks, Soils and Fossils	Working Scientifically Light and Shadow	Working Scientifically Forces, Friction and Magnets	Working Scientifically Movement and Nutrition for the Human	Working Scientifically Flowering Plants and Plant Growth	Working Scientifically Flowering Plant Life Cycle
<b>Year 4</b>	Working Scientifically Changes of State	Working Scientifically Electricity Circuits	Working Scientifically Human Impact on the Environment	Working Scientifically Movement and Nutrition	Working Scientifically Sound	Working Scientifically Classification of Plants and Animals
<b>Year 5</b>	Working Scientifically Forces and Mechanisms	Working Scientifically Properties and Uses of Materials	Working Scientifically Earth and Space	Working Scientifically Plant and Animal Life Cycles	Working Scientifically Separating Mixtures and Changing Materials	Working Scientifically Human Growth
<b>Year 6</b>	Working Scientifically Classification of Living Things	Working Scientifically Evolution and Inheritance	Working Scientifically What light Does	Working Scientifically Human Circulation	Working Scientifically Electricity: Changing Circuits	Working Scientifically Body Health



# Science in Early Years

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Overarching Theme	<b>MARVELLOUS ME</b> 	<b>LET'S CELEBRATE</b> 	<b>OUR WONDERFUL WORLD</b> 	<b>AMAZING ANIMALS</b> 	<b>ONCE UPON A TIME</b> 	<b>TICKET TO RIDE</b> 
	<b>The Natural World: Science</b>	<b>The Natural World:</b>	<b>The Natural World:</b>	<b>The Natural World:</b>	<b>The Natural World:</b>	<b>The Natural World:</b>
	Understand the effect of changing seasons on the natural world around them. Autumn/Winter Describe what they see, hear and feel whilst outside.	Understand the effect of changing seasons on the natural world around them. Winter/Spring Describe what they see, hear and feel whilst outside.	Understand the effect of changing seasons on the natural world around them. Winter/Spring Describe what they see, hear and feel whilst outside.	Understand the effect of changing seasons on the natural world around them. Summer Describe what they see, hear and feel whilst outside.	Understand the effect of changing seasons on the natural world around them. Summer Describe what they see, hear and feel whilst outside.	Understand the effect of changing seasons on the natural world around them. Summer Describe what they see, hear and feel whilst outside.
	Explore the natural world around them.  Snap Science – Bodies <a href="#">St John's Primary Staff Site - Bodies - All Documents</a>	Talk about the differences between materials and the changes they notice (cooking).	Recognise some environments that are different to the ones in which they live. Understand the key features of the life cycle of a plant.	Understand the key features of the life cycle of an animal. Observational drawings of animals (minibeasts). Children will understand and use some language related to	Explore how things work – (making bridges for the Three Billy Goats). Plant seeds and care for growing plants (Jack and the Beanstalk).	Explore and talk about different forces that they can feel (gravity). Children will investigate floating and sinking, making observations and making their own boats.
	<b>What happens to the trees in Autumn</b> <a href="#">St John's Primary Staff Site - What is happening to the trees - Autumn - All Documents</a>  <b>Oral Health</b>  ICT – Barefoot Planning Busy Bodies <a href="#">Busy bodies</a>	<b>Snap Science - What happens to the trees in Autumn (continued)</b> <a href="#">St John's Primary Staff Site - What is happening to the trees - Autumn - All Documents</a>  ICT – Barefoot Planning <a href="#">St John's Primary Staff Site - Awesome autumn - All Documents</a>	Plant seeds and care for growing plants. Observational drawings of plants. Talk about the differences between materials and the changes they notice (freezing/melting).	animals e.g. camouflage, predator, nocturnal.	Talk about the differences between materials and the changes they notice (porridge Goldilocks).	

# Year 1 Substantive Knowledge

Module 1 Seasonal changes	Module 2 Human body and senses	Module 3 Naming and describing materials	Module 4 Properties and uses of materials	Module 5 Animals (vertebrates)	Module 6 Identifying plants and their parts
<p>observe changes across the four seasons</p> <p>observe and describe weather associated with the seasons and how day length varies</p>	<p>identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p>	<p>distinguish between an object and the material from which it is made</p> <p>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock</p>	<p>distinguish between an object and the material from which it is made</p> <p>describe the simple physical properties of everyday materials</p> <p>compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p>identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p>	<p>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>identify and describe the basic structure of a variety of common flowering plants, including trees</p>



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# Year 1 Content Overview

Module 1 Seasonal changes	Module 2 Human body and senses	Module 3 Naming and describing materials	Module 4 Properties and uses of materials	Module 5 Animals (vertebrates)	Module 6 Identifying plants and their parts
<p><i>This Biology module is taught across the year, so that the children can observe the impact of the changing seasons around them.</i></p>					
1: Are all leaves the same? (September)	1: Is everybody's body the same?	1: What material is this? Part 1	1: Can the same object be made from different materials?	1: Who's who in the animal (vertebrate) world?	1: What wild and garden plants can we find around our school?
2: Which animals share our space? (autumn)	2: How can we explore the world using our sense of touch?	2: What material is this? Part 2	2: What properties do materials have?	2: What's so special about birds?	2: What parts of a plant grow above the ground?
3: Do all trees shed their leaves? (early winter)	3: What can we hear?	3: Is all paper the same?	3: Does it bend or stretch?	3: What makes an amphibian an amphibian?	3: What parts of a plant grow under the ground?
4: Are all flowers the same? (spring)	4: What smells do we like and dislike?	4: Is all fabric the same?	4: Do all materials get wet?	4: Do fish have fingers?	4: Why are trees plants?
5: Which birds visit our bird feeders? (spring)	5: What differences can our tongues taste?	5: How can we group objects made of different materials?		5: Are humans mammals?	5: What are the similarities and differences between plants that have flowers?
6: How has our space changed over the year? (early summer)					



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# Year 2 Substantive Knowledge

Module 1 Local habitats	Module 2 Choosing materials	Module 3 Growing seeds and bulbs	Module 4 Growing up (animals and humans)	Module 5 Changing materials	Module 6 Growing healthy plants
<p>explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>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</p> <p>identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</p>	<p>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p>	<p>observe and describe how seeds and bulbs grow into mature plants</p>	<p>notice that animals, including humans, have offspring which grow into adults</p> <p>find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>	<p>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>



# Year 2 Content Overview

Module 1 Local habitats	Module 2 Choosing materials	Module 3 Growing seeds and bulbs	Module 4 Growing up (animals and humans)	Module 5 Changing materials	Module 6 Growing healthy plants
1: Are the things I find alive, have never been alive or once were alive?	1: Is that a good choice of material?	1: How do plants grow and change over time?	1: How do animals change as they grow?	1: How can I change the shape of an object?	1: How can we care for our plants?
2: What lives in my tree?	2: Which ball bounces highest?	2: How are seeds and bulbs different?	2: What do animals need to survive?	2: What properties allow a material to be changed?	2: Do mature plants need light?
3: What animals live in this woody habitat?	3: Which materials are good for a toddler's play dungarees?	3: What do seeds need to germinate?	3: How can we sort food into groups?	3: Which material is fit for purpose?	3: Does temperature affect the growth of mature plants?
4: What animals live in this grassy habitat?	4: Who develops new materials?	4: How tall will they grow?	4: How can humans stay clean?	4: What can pushes and pulls do?	4: Do mature plants need water?
5: What do animals that live in the woods eat?		5: What have we learnt about how a seed germinates?	5: How can humans stay active?		5: What have we learnt about what mature plants need to grow healthily?
6: What do animals that live in the pond eat?			6: How do humans stay healthy?		



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# Year 1 and 2 Disciplinary Knowledge

Working scientifically – the knowledge of how to gather and analyse evidence		
Key Stage 1 National Curriculum statements	In <i>Snap</i> Year 1 lessons children...	In <i>Snap</i> Year 2 lessons children continue to use and develop skills learnt in Year 1 and...
Asking simple questions and recognising that they can be answered in different ways	<ul style="list-style-type: none"> <li>ask questions about what they notice and <b>observe</b> in the world around them</li> <li>show curiosity about <b>similarities</b> and <b>differences</b> between living things and materials</li> <li>use what they have noticed or observed to answer questions</li> </ul>	<ul style="list-style-type: none"> <li>ask questions about how things are similar and different, materials' suitability and how things change</li> <li>begin to recognise that there are different ways to answer scientific questions, including naming things, sorting them and comparing them</li> </ul>
Observing closely, using simple equipment	<ul style="list-style-type: none"> <li>make <b>observations</b> using all their senses, using context-specific vocabulary to describe them</li> <li>use <b>magnifiers</b> to look more closely</li> <li>make <b>comparisons</b></li> </ul>	<ul style="list-style-type: none"> <li>make more systematic observations of features and changes</li> <li>take <b>measurements</b> using non- standard units (string, blocks), and then cm</li> <li>learn that a <b>thermometer</b> is used to measure <b>temperature</b></li> </ul>
Performing simple tests	<ul style="list-style-type: none"> <li>follow simple instructions to carry out simple comparative <b>tests</b></li> <li>use practical resources provided, including water droppers</li> </ul>	<ul style="list-style-type: none"> <li>learn to only change one thing in a <b>comparative test</b> to make sure it is <b>fair</b></li> <li>begin to plan simple tests independently</li> <li>learn how to set up an <b>observation over time</b> enquiry</li> <li>predict a <b>result</b> using prior experience and knowledge</li> </ul>
Identifying and classifying	<ul style="list-style-type: none"> <li>use sorting hoops to <b>group</b> materials and objects using their own and given criteria</li> <li>use simple ID sheets to <b>identify</b> living things</li> </ul>	<ul style="list-style-type: none"> <li>select their own sorting criteria</li> <li>use observable features to classify living things using ID cards</li> </ul>
Gathering and recording data to help in answering questions	<ul style="list-style-type: none"> <li>gather first-hand data from a variety of sources</li> <li>record their observations in words and labelled pictures (drawn and photos); simple prepared tables and pictograms; block and paper strip <b>bar charts</b></li> </ul>	<ul style="list-style-type: none"> <li>use prepared tables to classify living things and materials</li> <li>construct simple bar charts using templates</li> <li>add labels to <b>diagrams</b></li> </ul>
Using their observations and ideas to suggest answers to questions	<ul style="list-style-type: none"> <li>use simple scientific language to describe their observations and answer questions</li> <li>use their data to recognise and <b>rank</b> differences</li> </ul>	<ul style="list-style-type: none"> <li>identify <b>patterns</b> in their data</li> <li>use data collected in <b>enquiries</b> to inform their answers to questions</li> <li>begin to develop <b>explanations</b> based on evidence collected and previous experience and knowledge</li> </ul>

## Working scientifically – knowledge about science

In Key Stage 1, children learn that scientists are curious. They make observations of the world around them to build scientific knowledge, looking for similarities and differences between materials and living things to understand more about them and to be able to identify them. Scientists share this knowledge. Children experience at first hand how scientists set up enquiries to test ideas and find out what things are like and how they change. They learn that science enquiries don't always work. They learn that everyone can do science and that science is part of all their lives now and will be in the future.

**Blue text** indicates key working scientifically vocabulary taught and used in Year 1 and Year 2.

# Year 3 Substantive Knowledge

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
Rocks, soils and fossils	Light and shadows	Forces, friction and magnets	Movement and nutrition for the human body	Flowering plants and plant growth	Flowering plants life cycle
<p>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>recognise that soils are made from rocks and organic material</p> <p>describe in simple terms how fossils are formed when things that have lived are trapped within rock</p>	<p>recognise that they need light in order to see things and that dark is the absence of light</p> <p>notice that light is reflected from surfaces</p> <p>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>recognise that shadows are formed when the light from a light source is blocked by a solid object</p> <p>find patterns in the way that the size of shadows change</p>	<p>compare how things move on different surfaces</p> <p>notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>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</p> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	<p>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</p> <p>identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>investigate the way in which water is transported within plants</p>	<p>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>





# Year 3 Content Overview

Module 1 Rocks, soils and fossils	Module 2 Light and shadows	Module 3 Forces, friction and magnets	Module 4 Movement and nutrition for the human body	Module 5 Flowering plants and plant growth	Module 6 Flowering plants life cycle
1: How are rocks different and what rock is this?	1: What do we need to see?	1: What makes it move?	1: What nutrition do we get from our food?	1: What do leaves do?	1: What is inside a flower?
2: What are rocks used for?	2: Which object is the most reflective?	2: How long does a top spin on different surfaces?	2: Which nutrients are in school dinners?	2: What do roots and stems do?	2: What is animal pollination?
3: How are soils different?	3: How are shadows made?	3: How well can an object slide on different surfaces?	3: What is in a human skeleton?	3: What are the functions of the parts of a flowering plant?	3: What is wind pollination?
4: Which soils hold water?	4: Is my shadow like me?	4: How do magnets affect each other?	4: How do muscles help humans to move?	4: What happens if plants do not have enough space?	4: What are fruits?
5: What is this fossil?	5: How can we change the size of a shadow?	5: Which materials are magnetic?	5: How are vertebrate and invertebrate bodies supported?	5: How are plants different?	5: How are seeds dispersed?
6: Who was Mary Anning and how did she become a palaeontologist?		6: How strong are the magnets?	6: Are all vertebrate skeletons the same?		



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# Year 4 Substantive Knowledge

Module 1 Changes of state	Module 2 Electricity: circuits	Module 3 Human impact on the environment	Module 4 Digestion and food chains	Module 5 Sound	Module 6 Classification of plants and animals
<p>compare and group materials together, according to whether they are solids, liquids or gases</p> <p>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</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>	<p>recognise that environments can change and that this can sometimes pose dangers to living things</p>	<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>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>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>



# Year 4 Content Overview

Module 1 Changes of state	Module 2 Electricity: circuits	Module 3 Human impact on the environment	Module 4 Digestion and food chains	Module 5 Sound	Module 6 Classification of plants and animals
1: Is this material a liquid or a solid?	1: What makes an appliance work?	1: What is the impact of litter in our school?	1: Where does all the food we eat go?	1: How are sounds made?	1: How are living things classified?
2: How is temperature measured?	2: How can you light the bulb?	2: How do materials change over time?	2: What teeth do humans have?	2: How do sounds reach our ears?	2: How are vertebrates classified?
3: What difference does temperature make to how quickly the ice block melts?	3: What does a switch do?	3: How do micro-plastics get into the food chain?	3: What do teeth do in the digestive system?	3: How can we change the volume of a sound?	3: How are invertebrates classified?
4: What are melting and freezing?	4: Why doesn't the circuit work?	4: How can we prevent micro-plastics from getting into our seas and oceans?	4: What happens to food after we put it in our mouths?	4: How does the volume of a sound change as we move away from the source?	4: Can you use a branching key?
5: Are spaces really empty?	5: Which materials conduct electricity?	5: How can we clean up birds affected by an oil spill?	5: What do animals eat?	5: How can we change the pitch of a sound?	5: What is this living thing?
6: What is evaporation and how does it help to get things dry?			6: What do animal teeth tell us?	6: What affects the pitch of a plucked note?	
7: Where did the water come from?					
8: Where does the rain come from?					



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# Year 3 and 4 Disciplinary Knowledge

Working scientifically – the knowledge of how to gather and analyse evidence		
Lower Key Stage 2 National Curriculum statements	In <i>Snap</i> Year 3 lessons children...	In <i>Snap</i> Year 4 lessons children continue to use and develop skills learnt in Year 3 and...
Asking relevant questions and using different types of scientific enquiries to answer them	<ul style="list-style-type: none"> <li>• suggest questions they could investigate</li> <li>• learn the names of different types of <b>enquiry</b></li> <li>• state what science they did to answer the question</li> </ul>	<ul style="list-style-type: none"> <li>• decide how to gather evidence to answer a scientific question</li> <li>• use a range of question stems</li> <li>• answer questions posed by the teacher identifying the type of enquiry they have used to answer the question</li> </ul>
<b>Setting up simple practical enquiries, comparative [and fair] tests</b> (It is a comparative test when a qualitative or categoric variable is changed, for example, the surface a top spins on. This leads to a ranked outcome. It is a fair test when a qualitative or continuous variable is changed, for example, the temperature at which an ice cube melts, leading to identification of a causal relationship. In both only one variable is changed.)	<ul style="list-style-type: none"> <li>• plan <b>observing over time enquiries</b>, making some decisions about what <b>observations</b> and/or <b>measurements</b> they will need to make and when</li> <li>• plan simple <b>comparative tests</b>, making some decisions about what to change and what to measure</li> <li>• make some decisions about which practical resources to use</li> </ul>	<ul style="list-style-type: none"> <li>• use the terms <b>variable</b> and <b>control variable</b></li> <li>• use a <b>fair test</b> planner to identify variables to change, measure and keep the same to answer a question</li> <li>• plan and carry out a fair test</li> <li>• plan and carry out a comparative test</li> <li>• follow instructions to carry out a <b>pattern seeking</b> enquiry</li> </ul>





# Year 3 and 4 Disciplinary Knowledge

Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	<ul style="list-style-type: none"> <li>learn to use a <b>data logger</b> or <b>light meter app</b>, <b>stopwatch</b>, weighing scales (digital), rulers</li> <li>make observations using a <b>digital microscope</b></li> <li>use standard units for measurements</li> <li>make systematic and careful observations</li> </ul>	<ul style="list-style-type: none"> <li>learn to use a thermometer</li> <li><b>use standard units for measurements</b></li> <li>use senses to make detailed observations</li> </ul>
Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	<ul style="list-style-type: none"> <li>gather <b>evidence</b> from a range of sources including first hand observation and experimental <b>data</b>, and secondary sources of information, to answer scientific questions</li> <li>use tally charts</li> </ul>	<ul style="list-style-type: none"> <li>become more systematic and <b>accurate</b> in data collection</li> </ul>
Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	<ul style="list-style-type: none"> <li>construct tables</li> <li>draw labelled <b>diagrams</b> with keys</li> <li>construct simple food chains</li> <li>use scientific language in writing and orally</li> <li>make some decisions about how to record observations</li> </ul>	<ul style="list-style-type: none"> <li>learn to use <b>branching keys</b></li> <li>learn to draw a <b>bar chart</b>, labelling axes and choosing a scale with suitable intervals</li> <li>use (non-standard) symbols to represent an electrical circuit</li> <li><b>sequence</b> flow charts</li> <li>learn to use <b>Venn and Carroll diagrams</b></li> <li>make detailed observational drawing</li> </ul>
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	<ul style="list-style-type: none"> <li>use different ways to report enquiry findings: posters, writing explanatory sentences, labelled diagrams, oral presentation, drama</li> </ul>	<ul style="list-style-type: none"> <li>begin to make choices about how to report enquiry findings</li> <li>use appropriate scientific vocabulary consistently and accurately</li> </ul>



# Year 3 and 4 Disciplinary Knowledge

Using results to draw simple conclusions, make predictions for new values, suggest improvements [and raise further questions]	<ul style="list-style-type: none"> <li>• use prior knowledge or <b>data</b> collected in lessons to <b>predict</b> outcomes of tests,</li> <li>• use evidence collect in a range of methods and their current knowledge to formulate simple <b>conclusions</b>,</li> <li>• begin to <b>evaluate</b> effectiveness of tests</li> </ul>	<ul style="list-style-type: none"> <li>• identify a simple <b>pattern</b> between two data sets</li> <li>• use test results to propose solutions to problems</li> </ul>
Identifying differences, similarities [or changes] related to simple scientific ideas and processes	<ul style="list-style-type: none"> <li>• identify <b>differences and similarities</b> they have observed in data they have collected at first hand or from secondary sources, and relate them to simple scientific ideas and processes they have learned about</li> </ul>	<ul style="list-style-type: none"> <li>• use evidence to generate comparative statements</li> <li>• begin to identify causal relationships</li> <li>• use simple <b>models</b> to represent scientific processes</li> </ul>
Using straightforward scientific evidence to answer questions or to support their findings	<ul style="list-style-type: none"> <li>• refer to own data when answering questions</li> </ul>	<ul style="list-style-type: none"> <li>• use data they have collected to answer questions</li> <li>• use scientific knowledge from secondary sources to answer questions</li> </ul>

## Working scientifically – knowledge about science

In lower Key Stage 2 children learn more about the ways that scientists work to build and communicate knowledge using a range of enquiry types. They learn that scientists make observations; ask questions; and collect, analyse and interpret data to test their ideas. Children experience at first hand the importance of being systematic and accurate when collecting data. They learn that scientists identify links, patterns and relationships between data and that they scientists present and explain their ideas and evidence in different ways, including using models. Children learn that scientific knowledge enables them to make good decisions about how they live and how we can look after our planet.

**Blue text** indicates key working scientifically vocabulary taught and used in Year 3 and Year 4.



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# Year 5 Substantive Knowledge

Module 1 Forces and mechanisms	Module 2 Properties and uses of materials	Module 3 Earth and space	Module 4 Plant and animal life cycles	Module 5 Separating mixtures and changing materials	Module 6 Human growth
<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>compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</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>	<p>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>describe the life process of reproduction in some plants and animals</p>	<p>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>	<p>describe the changes as humans develop to old age</p>





# Year 5 Content Overview

Module 1 Forces and mechanisms	Module 2 Properties and uses of materials	Module 3 Earth and space	Module 4 Plant and animal life cycles	Module 5 Separating mixtures and changing materials	Module 6 Human growth
1: What is the friction between different surfaces?	1: How can we compare and group materials?	1: What's in space?	1: How do flowering plants produce seeds?	1: How can we separate mixtures?	1: How do newborn babies turn into teenagers?
2: Why do objects fall at different speeds	2: Which materials did the builders use when constructing our school and why?	2: How do the planets move?	2: Do all plants have the same number of reproductive parts?	2: What happens when we mix liquids and solids?	2: How do girls become women?
3: How does the size of the canopy affect the time it takes a parachute to fall?	3: Which liquid is the thickest?	3: How does the position of the Sun in the sky change?	3: How can we grow more plants without using seeds?	3: What makes a difference to how fast sugar or salt dissolves?	3: How do boys become men?
4: Does the shape of an object affect its movement in a liquid?	4: Who invents things?	4: What causes day and night?	4: How do birds change over their lifetime?	4: How can we clean up contaminated water?	4: What is the human life cycle?
5: How can we lift a heavy load?	5: Can the same container keep cold things cold and hot things hot?	5: How does the Moon move?	5: Do all mammals have the same gestation period?	5: What makes a change non-reversible?	
6: How does the length of the lever affect the force needed to lift a load?	6: Which materials are absorbent, permeable or waterproof?	6: What patterns can we find in data about the planets?	6: How do amphibians change throughout their life cycle?	6: How much gas can be produced by a non-reversible change?	
7: How do gears work?			7: Do all insects go through the same life cycle?		



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# Year 6 Substantive Knowledge

Module 1 Classification of living things	Module 2 Evolution and inheritance	Module 3 What light does	Module 4 Human circulation	Module 5 Electricity: changing circuits	Module 6 Body health
<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 of the same kind, but normally offspring vary and are not identical to their parents</p> <p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	<p>recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	<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>describe the ways in which nutrients and water are transported within animals, including humans</p>	<p>associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>use recognised symbols when representing a simple circuit in a diagram</p>	<p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p>



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# Year 6 Content Overview

Module 1 Classification of living things	Module 2 Evolution and inheritance	Module 3 What light does	Module 4 Human circulation	Module 5 Electricity: changing circuits	Module 6 Body health
1: How can we sort the mess?	1: How are living things different?	1: How does light travel?	1: What is blood made of?	1: How do we light the lamp?	1: How can we make healthy food choices?
2: What plants are there other than flowering plants?	2: How is an organism adapted to live in its habitat?	2: What can we change about a shadow?	2: What is the circulatory system and what does it do?	2: How can we change a circuit?	2: What can happen if you don't eat a balanced diet?
3: How can we classify animals?	3: How do an animal's adaptations help it to survive?	3: What might affect the size of a shadow?	3: What is the heart and what does it do?	3: How can we change the brightness of a lamp?	3: How does physical activity affect heart rate?
4: What else is living besides animals and plants?	4: What can fossils tell us?	4: What affects the size of a shadow?	4: What are blood vessels and what do they do?	4: How can we change how other components work?	4: How do smoking or vaping affect your lung capacity?
5: How can we identify living things?	5: How does evolution happen?	5: How is light reflected?	5: What did William Harvey find out about the circulatory system?	5: How can we predict which circuit will have the brighter lamp?	
6: What lives here?	6: How did Wallace and Darwin come up with the idea of natural selection?	6: How do we see objects?			
7: Where do these organisms fit in my key?					



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# Year 5 and 6 Disciplinary Knowledge

Working scientifically – the knowledge of how to gather and analyse evidence		
Upper Key Stage 2 National Curriculum statements	In <i>Snap</i> Year 5 lessons children...	In <i>Snap</i> Year 6 lessons children continue to use and develop skills learnt in Year 5 and...
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	<ul style="list-style-type: none"> <li>identify <b>independent and dependent variables</b> and use these to generate fair and comparative test questions</li> <li>identify the important variables to <b>control</b> when carrying out a <b>comparative or fair test</b></li> <li>research <b>secondary sources</b> to find answers to questions</li> <li><b>justify</b> selection of <b>enquiry</b> type</li> </ul>	<ul style="list-style-type: none"> <li>make planning decisions about where and how to collect information (recognising and controlling variables, deciding what <b>observation</b> or <b>measurements</b> to make over time and for how long, using suitable samples to identify patterns)</li> <li>recognise how secondary sources can be used to answer questions that cannot be answered through practical work</li> <li>ask and write enquiry questions</li> </ul>
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	<ul style="list-style-type: none"> <li>learn to use a force meter</li> <li>measure liquids <b>accurately</b> using measuring cylinders</li> <li>make decisions about whether <b>repeat readings</b> are required to get <b>accurate data</b></li> </ul>	<ul style="list-style-type: none"> <li>construct data collection tables</li> <li>select measuring equipment to give the most <b>precise</b> results including <b>force meters</b> with a suitable <b>scale</b>, ruler or <b>tape measure</b>,</li> <li>make decisions about whether further research (secondary sources) is required</li> </ul>
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	<ul style="list-style-type: none"> <li>create tables to collect data</li> <li>draw and label line graphs, scatter graphs and bar charts with the variables on the correct axis, choose a suitable scale with equal intervals and plot data correctly</li> <li>draw labelled diagrams of mechanisms and structures</li> </ul>	<ul style="list-style-type: none"> <li>construct and use a range of ways to record and sort data</li> <li>create <b>branching keys</b> with four or more items</li> <li>draw <b>circuit diagrams</b> using recognised <b>symbols</b></li> </ul>



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# Year 5 and 6 Disciplinary Knowledge

Using test results to make predictions to set up further comparative and fair tests	<ul style="list-style-type: none"> <li>use test results gathered or knowledge acquired to make <b>predictions</b></li> <li>pose further questions</li> </ul>	<ul style="list-style-type: none"> <li>recognise when further tests and observations are needed to answer questions</li> </ul>
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	<ul style="list-style-type: none"> <li>use data gathered to identify causal relationships</li> <li>explain how to increase the accuracy and precision of measurements</li> <li>use key vocabulary accurately and consistently</li> <li>make decisions about salient and relevant data to present</li> <li>recognise that there are many different ways to report findings: scales, charts, reports, annotated diagrams, graphs, charts, inventor's notebooks, multimedia presentations such as website pages and television advertisements</li> <li>draw valid <b>conclusions</b> from data collected</li> </ul>	<ul style="list-style-type: none"> <li>analyse <b>scatter graphs</b></li> <li>recognise that in a <b>pattern seeking</b> enquiry it is important to have as much data as possible</li> <li>use scientific language to communicate findings from a range of enquiries in written, oral, dramatic and multimedia presentations</li> <li>use and <b>evaluate models</b> to represent systems and processes</li> <li>evaluate methods used, control of variables, precision of measurements, credibility of secondary sources</li> <li><b>justify</b> trust in data</li> </ul>
Identifying scientific evidence that has been used to support or refute ideas or arguments.	<ul style="list-style-type: none"> <li>draw upon test data to construct an <b>explanation</b></li> <li>use observations and test data to provide <b>evidence</b> to <b>support</b> or <b>refute</b> ideas or arguments</li> </ul>	<ul style="list-style-type: none"> <li>evaluate limitations of data collected or from secondary sources</li> <li>explain why scientists do not always agree</li> <li>differentiate between fact and opinion</li> </ul>

## Working scientifically – knowledge about science

In upper Key Stage 2 children learn more about the ways that scientists work to build and communicate knowledge. They learn that science is universal and has been carried out throughout history. Children experience at first hand how scientists work through an iterative enquiry process, in which answering one question often leads to another. They learn that scientists design and evaluate enquiries in order to maximise the trustworthiness of their data. Children learn at first hand to use their own growing scientific knowledge to review and question their own ideas and understanding and that of others and to appreciate that over time areas of science can change and develop in response to new evidence.

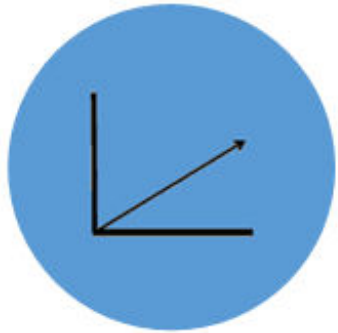
**Blue text** indicates key working scientifically vocabulary taught and used in Year 5 and Year 6.



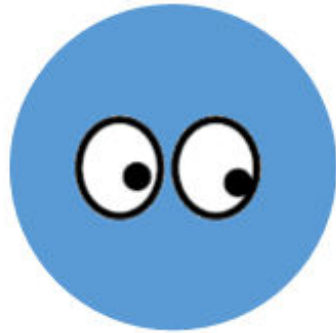
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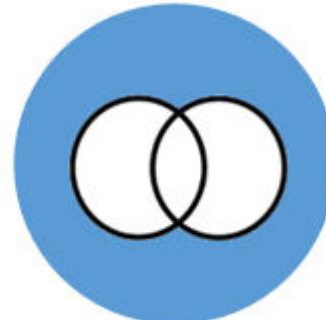
# Developing Schema Knowledge



Pattern Seeking



Observation over time



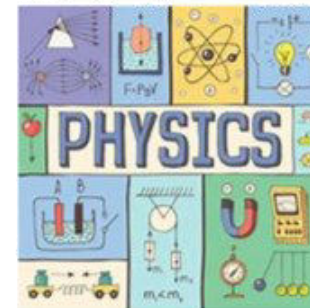
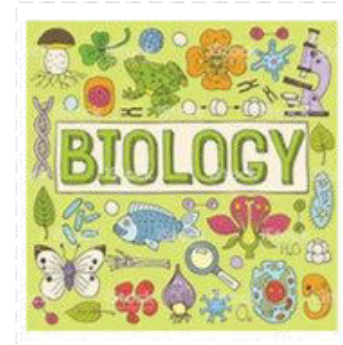
Identifying, classifying and  
grouping



Comparative and fair testing



Researching secondary  
sources








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# Schema Maps

Science Year 1






	Science Domain	 Pattern Seeking	 Observation over time	 Comparative and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Seasonal Change	Physics		✓			✓
Human Body and Senses	Biology					✓
Naming and Describing Materials	Chemistry	✓		✓		✓
Properties and use of Materials	Chemistry			✓		✓
Animals (Vertebrates)	Biology				✓	✓
Identifying Plants and their Parts.	Biology					✓



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# Schema Maps

Science Year 2






	Science Domain	 Patterns Seeking	 Observation over time	 Comparative and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Local Habitats	Biology					✓
Choosing Materials	Chemistry			✓		
Growing Seeds and bulbs	Biology	✓	✓	✓		✓
Growing up (animals and humans)	Biology		✓			✓
Changing Materials	Chemistry					✓
Growing Healthy Plants	Biology	✓		✓		



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# Schema Maps

Science Year 3

	Science Domain	 Patterns Seeking	 Observation over time	 Comparative and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Rocks, Soils and Fossils	Chemistry			✓	✓	✓
Light and Shadow	Physics			✓		
Forces, Frictions and Magnets	Physics	✓		✓		
Movement and Nutrition for the Human Body	Biology	✓			✓	✓
Flowering Plants and Plant Growth	Biology		✓	✓	✓	✓
Flowering Plant Life Cycle	Biology		✓			








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# Schema Maps

Science Year 4

	Science Domain	 Pattern Seeking	 Observation over time	 Comparatives and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Changes of State	Chemistry		✓	✓		✓
Electricity Circuits	Physics			✓	✓	
Human Impact of the Environment	Biology	✓	✓	✓		
Movement and Nutrition	Biology	✓			✓	
Sound	Physics			✓		
Classification of Plants and Animals	Biology				✓	✓



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# Schema Maps

Science Year 5






	Science Domain	 Pattern Seeking	 Observation over time	 Comparative and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Forces and Mechanisms	Physics			✓		
Properties and Uses of Materials	Chemistry			✓		✓
Earth and Space	Physics	✓	✓		✓	
Plant and Animal Life Cycles	Biology	✓	✓			✓
Separating Mixtures and Changing Materials	Chemistry			✓	✓	✓
Human Growth	Biology				✓	



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# Schema Maps

Science Year 6

	Science Domain	 Pattern Seeking	 Observation over time	 Comparison and fair testing	 Researching secondary sources	 Identifying, classifying and grouping
Classification of Living Things	Biology		✓			✓
Evolution and Inheritance	Biology	✓			✓	
What Light Does	Physics			✓		
Human Circulation	Biology				✓	
Electricity: Changing Circuits	Physics			✓		
Body Health	Biology	✓			✓	



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# Assessment for Working Scientifically

<u>Key Stage 1</u>	<u>Lower Key Stage 2</u>	<u>Upper Key Stage 2</u>
<p>During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• asking simple questions and recognising that they can be answered in different ways</li> <li>• observing closely, using simple equipment</li> <li>• performing simple tests</li> <li>• identifying and classifying</li> <li>• using their observations and ideas to suggest answers to questions</li> <li>• gathering and recording data to help in answering questions</li> </ul>	<p>During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• asking relevant questions and using different types of scientific enquiries to answer them</li> <li>• setting up simple practical enquiries, comparative and fair tests</li> <li>• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>• using straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<p>During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

