

St John's Church Of England Primary School

Science Progression Grid KS1






Midsomer Norton
Schools Partnership

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry, and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

The national curriculum for Science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry, and physics
- develop understanding of the nature, processes, and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Within the disciplines of Science, we have identified the 'big ideas' (or threshold concepts) which are schemata which give the learning coherence. These big ideas are:






Biology 	Chemistry 	Physics 
Plant Life Animals and Humans Living things and their environments Evolution and Inheritance	Substances and their properties	Movement, forces, and magnets Light and seeing Sound and hearing Electricity Earth in space

Progression: The substantive knowledge (i.e. the science content) will be taught in units, and the disciplinary knowledge (i.e. working scientifically) is taught in context. Hierarchical elements of working scientifically will be reflected in the units and therefore this will be built up accordingly.

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We teach pupils to know about the unique processes of enquiry in science. Our 'Big Ideas' for Working Scientifically are:

<p>Observing over Time</p>	
<p>Observing, Classifying and Grouping</p>	
<p>Comparative and Fair Testing</p>	
<p>Pattern Seeking</p>	
<p>Research Using Secondary Sources</p>	

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How learning starts in the Early Years

Science in the Early Years is very exploratory and language rich. Children are actively encouraged to talk about how weather and materials change over time and why. Books and visual aids are provided to develop understanding of natural changes in the world. Children are encouraged to observe each stage of changes during experiments/activities and are provided with a rich vocabulary in order to discuss scientific threshold concepts.

Children learn about the **life cycles** of chickens, frogs and butterflies with eggs, spawn and caterpillars being brought into school. They are encouraged to observe the daily changes, comment on what they see and develop their questioning skills to find out more.

Children learn about **planting** and the conditions needed for plants to grow. They have opportunities to grow vegetables in our raised bed, plant sunflowers and beans, watching and commenting on the progress and stages in growth. Children learn about **substances and properties** when cooking and within the malleable area. They make dough and explore the properties of malleable materials such as corn flour, sand, clay.

Earth in space as a theme is explored through the use of books, stories, and media clips.

Forest School plans for exploration of the natural world, looking for similarities and differences, **habitats**, and spotting **changes** in the seasons. Children are asked to explain findings, and explain why things occur and how changes happen.

Within the provision, toys and resources linked to threshold concepts in science support the observation skills. e.g Light box, circuits, magnifying glasses, rocks, shells fossils, magnets and loose parts.

Year 1

TERM	1	2	3	4	5	6
Topic Title and NC Reference, threshold concept	Animals including humans (animals and humans) 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. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • Identify, name, draw and		Everyday materials and their uses (substances and properties) 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.		Plant Detectives (plant life) 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.	

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	label the basic parts of the human body and say which part of the body is associated with each sense. Identify and name a variety of plants and animals in their habitats, including micro-habitats.		
Prior learning	<p>(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants</p> <p>Early Years: Know the names of animals and baby animals that live on a farm Learn what farm animals need to grow and a simple explanation of their life cycles Learn what a habitat is and what an animal needs from its habitat- food, water, shelter Identify some minibeasts and their habitats Identify why a woodland is a suitable habitat for some animals. Identify some animals living in a polar habitat and their features. Know how they adapt to survive in cold conditions.</p>	<p>(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants</p> <p>Early Years : Know the names of some materials that are more likely to float and sink Know that some materials are waterproof, and some are not, and the names of some common materials: wood, paper, plastic, metal, glass, fabric Know that some materials can be mixed to make stronger materials, eg when building a wall</p>	<p>(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants</p> <p>Understand some important processes and changes in the natural world around them, including the seasons</p> <p>Early Years: Know the names of some plants and wildflowers in the school grounds and locality Stages of growth and death of plants Know that seeds need water and warmth to grow Observe the changes that take place to plants and trees in autumn, winter and spring Know the basic parts of a plant, flower, stem, root, and basic parts of a tree, trunk, root, branches</p>
Sticky knowledge	Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair . These key features can be	Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc.	Names of trees and other plants that they see regularly Identify features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom/ fruit Definition and examples of trees

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	<p>used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different microhabitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These microhabitats have different conditions e.g. light or dark, damp or dry.</p> <p>Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling.</p> <p>Recognise characteristics of: vertebrate, invertebrate, reptile, fish, amphibian, carnivore, herbivore , parts of the human body associated with senses, main body parts head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth)</p>	<p>Some materials e.g. plastic can be in different forms with very different properties.</p> <p>Know and explain the meaning of : 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</p>	<p>which lost their leaves and those that kept them the whole year. Names of the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green</p> <p>Know and recognise : leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud</p>
<p>Working scientifically focus and activities</p>	<p>Identify Classify and Group Classify animals according to what they eat - <i>Sorting rings/pictures</i></p>	<p>Comparative and fair testing Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, and waterproofness of shelters - <i>tables, photographs, sorting rings</i></p>	<p>Identify Classify and Group Sort and group parts of plants and trees using similarities and differences - <i>Table/sorting rings</i></p>

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<p>Identify parts of the body associated with senses - Recorded using pictures/diagram of body</p> <p>Group pictures of animals according to their characteristics, play 'what am?', label and describe pictures - Labelled sorting rings</p> <p>Identify habitats and microhabitats in the school grounds (forest school) - Photographs</p> <p>Seek Patterns Investigate whether size of teeth changes what an animals eat (linked to History Dinosaur topic)</p> <p>Make comparisons to seek patterns about body parts and features e.g. "We both have hands, but his are bigger than mine." "These people have brown eyes and these have blue." - Discussion based</p>	<p>Identify Classify and Group Classify objects made of one material in different ways e.g. a group of objects made of metal - Sorting rings</p> <p>Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials - Table</p> <p>Classify materials based on their properties - Table</p>	<p>Use simple charts etc. to identify plants and trees in the local area - Collect data individually/groups and create a whole class bar chart</p> <p>Use photographs to talk about how plants change over time - Write up</p>
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<p>End of unit task</p>	<p>Investigate living things Create an environment for woodlice in the forest school area – Prove that this is a successful habitat Or: How can we organise and classify all the animals in the zoo?</p>	<p>Investigate materials Investigate materials suitable for a baby owl nest (or similar investigation) Use tests on materials to demonstrate their findings</p>	<p>Understand plants Create a spotters guide to school plants using a categorisation key.</p>
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Year 2

TERM	1	2	3	4	5	6
<p>Topic Title and NC objectives</p>	<p>Growing up and Taking Care (Animals and humans, Evolution and Inheritance) Know 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 and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p>Chemistry – Materials (Substances and Properties) 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.</p>	<p>Apprentice Gardener (Plant life, Organisms and their environments) 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.</p>	<p>Biology – All things Bright and Beautiful (Plant life, organisms and their environments) 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 Identify and name a variety of plants and animals in their habitats, including micro-habitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and</p>		

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				identify and name different sources of food
Prior knowledge	Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 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.	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: hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through.	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. Identify and describe functions of : leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, bud	Name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of plants and trees. Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare a variety of common animals (fish, amphibians, reptiles, birds and mammals).
Sticky knowledge	Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young. In other animals, such as chickens or insects, there may be eggs laid. Young of some animals do not look like their parents e.g. tadpoles. All animals have the basic needs of feeding, drinking and breathing. They also	A material can be suitable for different purposes and an object can be made of different materials . Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing ,	Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and	All objects are either living, dead or have never been alive . Living things are plants (including seeds) and animals. Animals and plants live in a habitat to which they are suited. The habitat provides the basic needs of the animals and plants – shelter, food and water . Within a habitat

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	<p>need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses.</p> <p>Know and explain: Offspring, reproduction, growth, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (with examples).</p>	<p>stretching, rolling, pressing etc. Know and explain: opaque, transparent and translucent, reflective, non-reflective, flexible, rigid.</p>	<p>they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.</p> <p>Know and describe: light, shade, sun, warm, cool, water, grow, nutrients, germination, seed, berry, fruit.</p>	<p>there are different micro-habitats. Microhabitats have different conditions. The way that animals obtain their food from plants and other animals can be shown in a food chain. All food chains begin with plant life.</p>
<p>Working scientifically focus and activities</p>	<p>Identify classify and group Match animals to offspring - Table</p> <p>Classify animals into those who give birth and those who lay eggs - Sorting rings</p> <p>Classify food according to the eatwell guide and healthy/ unhealthy choices - Table</p> <p>Pattern seeking Describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults - Cycle diagram</p> <p>Comparative and fair testing</p>	<p>Identify Classify and Group Sort and classify materials according to properties. Play what am I? - Sorting rings</p> <p>Comparative and fair testing Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat etc - Table</p>	<p>Observe over time Observing a seed as it grows into a plant. Choose one that produces seeds (eg sunflower) so they can see the full lifecycle - Bar chart</p> <p>Research and plan when and how to plant a range of seeds and bulbs. Look after the plants as they grow – thinning, watering etc. Make close observations and measurements of their plants growing from seeds and bulbs - Bar chart, table, photos and write ups</p>	<p>Identify Classify and Group Explore the outside environment, find objects that are living, dead and have never lived - Sorting rings/tables</p> <p>Identify and describe microhabitats in the school grounds - Table</p> <p>Pattern Seeking Create simple food chains for a familiar local habitat - Descriptive diagram</p> <p>Create simple food chains from information given e.g. in picture books (Gruffalo etc.) - Descriptive diagram</p>

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	Explore the effect of exercise on heartbeat - Practical followed by a write up			Research from secondary sources: Research habitats in known climate zones: polar, tropical - Pictures/write up
End of unit task	Describe features of healthy lifestyle Create a picture book for younger pupils to demonstrate what they know about keeping healthy.	Investigate materials Paper is unsuitable for a model boat. Do you agree or disagree? (reason and justify) or.. is all paper the same? Devise another hypothesis like this and test (eg best running wear material)	Investigate plant growth Grow a selection of plants from seeds and bulbs, looking into what each plant needs to grow. Document growth and changes. Check hypothesis eg, all plants need bright sunlight to grow.	Investigate living things Always, sometimes, never? Food chains end with a carnivore



Ongoing learning throughout Y1/2

Observation over time Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.	Collect information about the weather regularly throughout the year. • Present this information in tables and charts to compare the weather across the seasons. • Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. • Present this information in different ways to compare the seasons. Gather data about day length regularly throughout the year and present this to compare the seasons.
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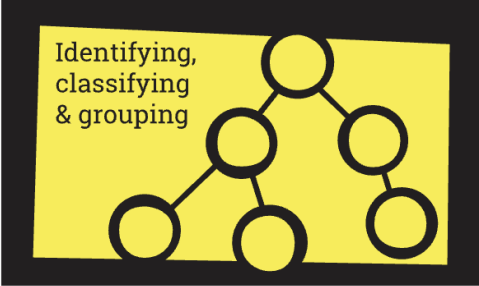


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Progression in Working Scientifically in Years 1 and 2

Concept	What pupils should know and be able to do	Key vocabulary
	<p>Pupils learn that scientists answer questions by gathering evidence, recording it and comparing it. Evidence can be gathered by observing and measuring. Pupils learn to make measurements using non standard units and record using simple bar and tally charts.</p>	<p>observe, measure question, find out, answer, predict, 'what do you think will happen', compare, observe, pattern, results, happened, table, measure, record, graph, chart,</p>
	<p>Careful observation can take time. It can happen over days, weeks and months. Measuring where possible can suggest what may be happening and why . Pupils learn to say what they are looking for and what they are measuring. They learn how to observe closely using the appropriate senses, aided by simple equipment such as magnifying glasses, digital microscopes, egg timers. They begin to take measurements, initially by comparisons, then using non-standard units. Observations can be recorded e.g. using photographs, videos, drawings, labelled diagrams or in writing.</p>	<p>measure, equipment, record, results, observe, compare, describe, compare, similar, different, unit measurements</p>

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 A yellow rectangular box with a black border. On the left, the text 'Identifying, classifying & grouping' is written in black. To the right, there is a diagram of a tree structure with a central yellow circle at the top, connected by black lines to two yellow circles below it, which are each connected to two more yellow circles at the bottom level.	<p>Identifying means to recognise something. Pupils learn that living and non-living things can be sorted according to their differences (classifying). They can then group things according to similarities and differences. These are called criteria. A classification key is a way of grouping according to criteria. pupils classify using simple prepared tables and sorting rings.</p>	<p>Look, notice, observe, compare, classify, describe, similar, different, features, sort, group, notice, biggest/smallest, best/worst, Venn diagram, key</p>
 A blue rectangular box with a black border. The text 'Pattern seeking' is written in white, slanted at the top left. In the center, a magnifying glass with a black handle and frame is focused on a yellow star. To the left and right of the magnifying glass are other yellow stars and red squares, suggesting a repeating pattern.	<p>Pupils learn that a pattern is something that acts or presents in a predictable or similar way. Patterns help us to explain and predict how things affect other. Pupils can use observations and ideas to suggest answers to questions</p>	<p>pattern, similar, different, predict, observe, measure</p>
 A green rectangular box with a black border. On the left, a computer monitor displays the text 'Research using secondary sources'. Below the monitor is a keyboard. To the right, there is an open book with a yellow arrow pointing to a page, and a white question mark with a spiral inside, symbolizing inquiry or research.	<p>Pupils need to know what a secondary source is in science and the difference between fact and interpretation. They see simple secondary sources to find answers. Can find information to help from books and computers with help.</p>	<p>Secondary, fact, interpretation, source.</p>

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End points:

Milestone 1

Biology:

- Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.
- Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.
- 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.
- Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.
- Identify and name a variety of common animals that are carnivores, herbivores, and omnivores.
- Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals, and invertebrates, including pets).
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- Notice that animals, including humans, have offspring which grow into adults.
- Investigate and describe the basic needs of animals, including humans, for survival (water, food, and air).
- Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.
- Explore and compare the differences between things that are living, that are dead and 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 micro-habitats.
- 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.

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- Identify how humans resemble their parents in many features.

Chemistry:

- 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.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching.
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.

Physics:

- Notice and describe how things move, using simple comparisons such as faster and slower.
- Compare how different things move.
- Observe and name a variety of sources of light, including electric lights, flames, and the Sun, explaining that we see things because light travels from them to our eyes.
- Observe and name a variety of sources of sound, noticing that we hear with our ears.
- Identify common appliances that run on electricity.
- Construct a simple series electrical circuit.
- Observe the apparent movement of the Sun during the day.
- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies.

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