Midsomer Norton Schools Partnership

Science KS1 curriculum progression

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**

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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.

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

Observing over Time 
Observing, Classifying and Grouping 
 **Comparative and Fair Testing**
Pattern Seeking 
Research Using Secondary Sources 

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How learning starts in the early years	Science in Early Years is very exploratory and language rich. Children are actively encouraged to talk about how things change over time and why. Books and visual aids are provided to develop understanding of natural changes. 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. Activities are planned around **life cycles**, **planting**, **substances and properties** when baking, **earth in space**. 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	**Plant Detectives** Biology – Plants in the environment , basic structure of plants **(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.	**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.		**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 label the basic parts of the human body and say which part of the body is associated with each sense. Identify	

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			and name a variety of plants and animals in their habitats, including micro-habitats
Prior learning	(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants Understand some important processes and changes in the natural world around them, including the seasons **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**	(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants **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**	(ELG 2022 the Natural World) Explore the natural world around them, making observations and drawing pictures of animals and plants **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.**
Sticky knowledge	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 which lost their leaves	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. Some materials e.g. plastic can be in	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 used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat

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	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 **Know and recognise** : **leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud**	different forms with very different properties. **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**	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. 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.** **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)**
Working scientifically focus and activities	**Identify Classify and Group** Sort and group parts of plants and trees using similarities and differences Use simple charts etc. to identify plants and trees in the local area. Use photographs to talk about how plants change over time	**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. **Identify Classify and Group** Classify objects made of one material in different ways e.g. a group of objects made of metal. Classify in different ways one type of object made from a range of materials e.g. a	**Identify Classify and Group** Classify animals according to what they eat Identify parts of the body associated with senses Group pictures of animals according to their characteristics, play ‘what am ?’, label and describe pictures. Identify habitats and microhabitats in the school grounds **Research using secondary sources** Research the habitats locally and further afield, eg an Oaktree, the Arctic **Seek Patterns**

		collection of spoons made of different materials. Classify materials based on their properties.	Investigate whether size of teeth changes what an animals eat, or whether animals in cold climates all have thick fur 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."
End of unit task	**Understand plants** Create a spotters guide to school plants using a categorisation key.	I**nvestigate materials** Investigate materials suitable for a baby owl nest (or similar investigation) Use tests on materials to demonstrate their findings	I**nvestigate 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?

Year 2

TERM	**1**	**2**	**3**	**4**	**5**	**6**
Topic Title and NC objectives	**Biology – All things Bright and Beautiful (Plant life, organisms and their environments)**	**Chemistry – Materials (Substances and Properties)**	**Apprentice Gardener (Plant life, Organisms and their environments)**		**Growing up and Taking Care (Animals and humans, Evolution and Inheritance)**	

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	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 identify and name different sources of food	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.	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.	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.
Prior knowledge	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	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,	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	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.

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	compare a variety of common animals (fish, amphibians, reptiles, birds and mammals).	see-through, not see-through		
Sticky knowledge	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 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.	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, stretching, rolling, pressing etc.** **Know and explain: opaque, transparent and translucent, reflective, non-reflective, flexible, rigid.**	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 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. **Know and describe: light, shade, sun, warm, cool, water, grow, nutrients, germination, seed, berry, fruit.**	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 need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. **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).**
Working scientifically focus and activities	**Identify Classify and Group** Explore the outside environment , find objects that are living, dead and have never lived.	**Identify Classify and Group** Sort and classify materials according to properties. Play what am I? **Comparative and fair testing**	**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	**Identify classify and group** Match animals to offspring Classify animals into those who give birth and those who lay eggs Classify food according to the Eatwell guide and healthy/ unhealthy choices

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	Identify and describe microhabitats in the school grounds **Pattern Seeking** Create simple food chains for a familiar local habitat Create simple food chains from information given e.g. in picture books (Gruffalo etc.) **Research from secondary sources:** Research habitats in known climate zones: polar, tropical	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	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.	**Pattern seeking** describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults **Comparative and fair testing** Explore the effect of exercise on heartbeat
End of unit task	**Investigate living things** Always, sometimes, never? Food chains end with a carnivore	**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.	**Describe features of healthy lifestyle** Create a picture book for younger pupils to demonstrate what they know about keeping healthy.

Ongoing learning throughout Y1/2

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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.

Progression in Working Scientifically in Years 1 and 2

Concept	What pupils should know and be able to do	Key vocabulary
	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.	observe, measure question, find out, answer, predict, 'what do you think will happen', compare, observe, pattern, results, happened, table, measure, record, graph, chart,
	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.	measure, equipment, record, results, observe, compare, describe, compare, similar, different, unit measurements

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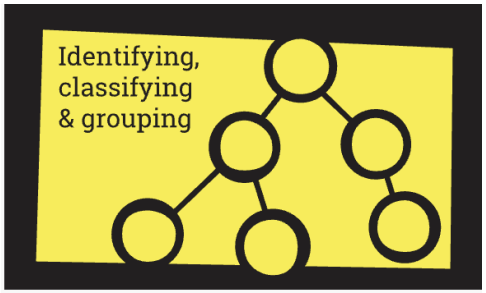	Identifying means to recognise something. Pupils learn that living and nonliving things can be sorted according to their differences (classifying) They can then group things according to similarities and differences. These are called criteria. A classification key is a way of grouping according to criteria. pupils classify using simple prepared tables and sorting rings	Look, notice, observe, compare, classify, describe, similar, different, features, sort, group, notice, biggest/smallest, best/worst, Venn diagram, key
	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	pattern, similar, different, predict, observe, measure

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	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.	Secondary, fact, interpretation, source.

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.

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• 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.

• 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.

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- 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.