



Science Skills Progression

'In science, pupils need their knowledge to be organised around the most important scientific concepts, which enable them to explain and predict a wide range of phenomena (Ofsted Research Review Series: Science).' To support this, St Margaret Clitherow follow the Primary Science Scheme of Work which is structured around ten overarching 'big ideas', each underpinned by key scientific concepts.

As pupils progress through the curriculum, they revisit and build upon these concepts in increasing depth and complexity. This approach enables them to develop rich and connected schemata, allowing new learning to be linked to prior knowledge and embedded within their long-term memory. Through carefully sequenced learning experiences, pupils develop a secure understanding of scientific knowledge and the ability to apply this understanding across different contexts.

Big Idea	KS1 (Years 1–2)	Lower KS2 (Years 3–4)	Upper KS2 (Years 5–6)
1. Structure & function	Identify basic parts of plants, animals and materials	Explain functions of parts (plants, skeletons, teeth)	Explain complex systems (circulatory system, materials with evidence)
2. Grouping & classification	Group living/non-living things and materials	Use classification keys; group by observable properties	Classify using scientific criteria and justify with evidence
3. Growth & development	Know animals grow and change	Describe life cycles of plants and animals	Compare and explain life cycles including humans
4. States of matter	Observe simple material changes	Understand solids, liquids, gases and changes	Explain reversible and irreversible changes
5. Life processes & health	Know basic needs of animals and plants	Understand nutrition, skeletons, digestion	Explain body systems and lifestyle impacts
6. Forces & movement	Explore pushes and pulls	Describe forces and magnetism	Explain gravity, friction and resistance
7. Interdependence & environment	Identify habitats and simple food chains	Construct food chains and understand change	Explain ecosystems and human impact
8. Evolution & inheritance	Recognise fossils as past life	Describe fossil formation	Explain evolution, adaptation and inheritance
9. Energy	Recognise light, dark and simple electricity	Explore sound, light and circuits	Explain energy transfer and patterns
10. Earth & space	Observe seasons and daily changes	Describe Earth processes (day/night)	Explain solar system and planetary movement

Big idea 1:

There is a relationship between how things are (structure) and the way things work (function)

Underpinning concepts: Materials, structure, function, properties

National curriculum links

Year 1:

- identify and describe the basic structure of a variety of common flowering plants, including trees
- describe and compare the structure of a variety of common animals
- 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 the simple physical properties of a variety of everyday materials

Year 2:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

Year 3:

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- identify that humans and some other animals have skeleton and muscles for support, protection and movement
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing

Year 4:

- identify the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions

Year 5:

- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

Year 6:

- identify and name the main parts of the circulatory system, and describe the functions of the heart, blood vessels and blood.

Big idea 2:

Living and non-living things can be grouped in a variety of ways

Underpinning concepts: Structure, deciduous, evergreen, amphibians, reptiles, mammals, birds, fish, classification, organisms.

Year 1:

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- 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
- compare and group together a variety of everyday materials on the basis of their physical properties

Year 2:

- explore and compare the differences between things that are living, dead and things that have never been alive

Year 3:

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- 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

Year 4:

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- explore ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants
- compare and group materials together, according to whether they are solids, liquids or gases

Year 5:

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity and response to magnets

Year 6:

- 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
- give reasons for classifying plants and animals based on specific characteristics.

Big idea 3:

Living things move through different stages of growth and development

Underpinning concepts: Change, life cycle, reproduction, offspring, genetics

Year 2:

- notice that animals, including humans, have offspring which grow into adults

Year 5:

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals
- describe the changes as humans develop to old age.

Big idea 4:

Everything on Earth exists in one of three states: solid, liquid, gas and the state of matter can change

Underpinning concepts: Mass, matter, states of matter, changing states of matter, water cycle, temperature, reversible and irreversible changes.

Year 2:

- find out about the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Year 4:

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled and measure or research the temperature at which this happens in degrees Celsius
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Year 5:

- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

Big idea 5:

Living things have common life processes to survive; lifestyle choices impact survival and health

Underpinning concepts: Senses, carnivore, herbivore, omnivore, environment, life processes, reproduction, nutrition, survival, skeleton, muscles, digestive system, circulatory system, organs.

Year 2:

- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
- 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

Year 3:

- 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

Big idea 6:

Changing the movement of an object requires a force (push or pull) to be acting on it

Underpinning concepts: Magnetism, air resistance, gravity, friction, water resistance, mechanisms.

Year 3:

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

Year 5:

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

Big idea 7:

Living things depend on each other and on the environment; this can be positive or negative

Underpinning concepts: Climate change, sustainability, energy conservation, habitat, microhabitats, food chains, population, development.

Year 2:

- explore and compare the differences between things that are living, dead and things that have never been alive
- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants
- 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

Year 4:

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things

Big idea 8:

Living things have changed over time

Underpinning concepts: Theory of evolution, organic matter, adaptation, variation, offspring, fossils.

National curriculum links

Year 3:

- describe in simple terms how fossils are formed when things that have lived are trapped within rock

Year 6:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Big idea 9:

Energy makes things happen and can be seen by its effects; it can be transferred (but is not used up)

Underpinning concepts: Light, sound, electricity, waves, conductors and insulators.

National curriculum links

Year 3:

- recognise that they need light in order to see things and that dark is the absence of light
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change

Year 4:

- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of vibrations that produced it
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- 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
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit

Year 6:

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye

Big idea 10:

The movement of the Earth affects the times of day; the Sun is at the centre of our solar system

Underpinning concepts: Seasons, weather, solar system, Earth.

Year 1:

- observe changes across the 4 seasons

Year 5:

- describe the movement of the Earth and other planets relative to the sun in the solar system
- describe the movement of the moon relative to the Earth
- describe the sun, Earth and moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky