Skills Progression of Science Year 3 - Cornerstones

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Introduce: • Similarities and differences in relation to places, objects, materials and living things. • Discuss the features of their own immediate environment and how it might vary from others. • Make observations of animals and plants and explain why some things occur, and talk about changes. • Know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.	**Introduce:** • Everyday materials – types and comparison • Seasonal changes – across 4 seasons • Animals inc humans – 5 animal groups (mammal etc) • Plants – basic structure (stem, leaf, root, flower)	**Recap:** • Animals inc humans – 5 groups • Everyday materials - types • Plants – basic structure • Seasonal changes	**Recap:** • Plants – seeds and bulbs grow healthy, what is needed • Animals inc humans – exercise and hygiene	**Recap:** • Animals including humans – skeleton types and muscles • Rocks and soils – types and formation	**Recap:** • Living things – grouping and classification; • Forces and Magnets – push and pull; magnetic poles; magnetic materials	**Recap:** • Animals inc humans – digestive system; life cycle • Light - shadow formation and changes • Electricity – simple series; switches
		Introduce: • Living things – alive/ not alive, suited to habitats • Plants – seeds and bulbs grow healthy, what is needed • Animals inc humans – exercise and hygiene • Materials – everyday uses suitability; bend, twist, stretch, squash	**Introduce:** • Rocks and soils – types and formation • Forces and Magnets – push and pull; magnetic poles; magnetic materials • Light and shadows – shadow formation and changes • Animals inc humans – skeleton and muscles • Plants – structure functions, flower structure	**Introduce:** • States of matter – changing state of solid, liquid, gas; water cycle • Electricity – simple series circuits; switches; conductors and insulators • Sound – vibrations; pitch; volume; distance • Living things – grouping and classification; changing environments • Animals inc humans – digestive system	**Introduce:** • Earth and space – orbit of Earth to sun; orbit of Moon; Earth's rotation • Materials – reversible and irreversible changes; dissolving; separation • Living things – life cycle and reproduction • Animals inc humans – changes in human development • Forces – gravity; resistance; mechanisms	**Introduce:** • Evolution and inheritance – adaptation; change over time; offspring • Light – straight lines; seeing things • Electricity – symbols; brightness/ volume changes • Living things – classification of plant/ animal kingdoms • Animals inc humans – circulatory system; diet, nutrients and exercise

Purposes for science:

It 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. All children 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, children 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.

We use Cornerstones as our planning base and science is taught within the topic if purposeful links can be made. If none are made, science is taught as a discrete subject.

Year 3

	Objective (NC PoS)	Skill	Vocabulary	Key Scientists
Term 1 and 2 **Animal nutrition and the skeletal system**	**- 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** **- Identify that humans and some animals have skeletons and muscles for support, protection and movement** • Ask relevant questions and using different types of scientific enquiries to answer them. • 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. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Identify differences, similarities or changes related to simple scientific ideas and processes. • 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. • Identify that humans and some other animals have skeletons and muscles for support, protection and movement. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Set up simple practical enquiries, comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support their findings.	• Ask questions about the world around them and explain that they can be answered in different ways. • Compare and contrast the diets of different animals. • Describe how humans need the skeleton and muscles for support, protection and movement. • Describe the requirements of plants for life and growth (air, light, water, nutrients and room to grow) and how they vary from plant to plant. • Explain the importance and characteristics of a healthy, balanced diet. • Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. • Identify and group animals that have no skeleton, an internal skeleton (endoskeleton) and an external skeleton (exoskeleton). • Make increasingly careful observations, identifying similarities, differences and changes and making simple connections. • Name and describe the functions of the different parts of flowering plants (roots, stem, leaves and flowers). • Set up and carry out some simple, comparative and fair tests, making predictions for what might happen. • Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	• <u>Food groups and **nutrients**</u>: fibre, fats **(saturated and unsaturated**), vitamins, minerals. • <u>Skeletons and muscles:</u> skeleton, **muscles, tendons, joints,** protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, **vertebrate, invertebrate,** endoskeleton, exoskeleton, hydrostatic skeleton. • <u>Names of human bones:</u> e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula. • Other: **energy**. Previously introduced vocabulary: movement.	**Diane France (1954 -)** Diane France solves mysteries and crimes by deciphering the stories bones tell her. http://iwaswondering.org/diane_homepage.html

Knowledge (specific knowledge)

- Questions can help us find out about the world and can be answered in different ways.
- Nutrition is the life process of making or finding food to eat. Humans must eat food and drink water to gain the nutrients they need to survive. Humans get nutrition from what they eat. Humans are omnivores, so they can eat both plant parts and animals.
- In the wild, animals' diets change over the year as the seasons change due to certain foods becoming available or unavailable.
- Carnivores only eat meat.
- Herbivores only eat plants.
- Omnivores eat meat and plants.
- Humans have a skeleton and muscles for movement, support and protecting organs. Muscles are soft tissue made up of many stretchy fibres. Muscles allow us to move, breathe and digest food. The three main types of muscle in the human body are skeletal, cardiac and smooth. A joint is where two or more bones meet and connect. Parts of the human body can bend easily because the skeleton has lots of small bones and joints.
- It is important to have a balanced diet made up of the main food groups, including: proteins, carbohydrates, fruit and vegetables, dairy products and alternatives, and fats and spreads. Humans stay hydrated by drinking water.
- Data can be used to provide evidence to answer questions.
- Vertebrates are animals with a spine.
- Invertebrates are animals without a spine.
- All vertebrates have an endoskeleton meaning their skeleton is found inside their body.
- Invertebrates have an exoskeleton or no skeleton.
- Many plants grow from seeds or bulbs.
- Plants have roots, stems, leaves, flowers and fruit.
- Plants are living things because they grow, take in water and nutrients and reproduce.
- Plants need air, light, water, nutrients and room to grow, in order to survive.
- A prediction is a best guess for what might happen in an investigation based on some prior knowledge

Term 3

Forces and magnets

- 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, and identify some magnetic materials** **- Describe magnets as having two poles** **- Predict whether two magnets will attract or repel each other, depending on which poles are facing.** • Ask relevant questions and using different types of scientific enquiries to answer them. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Set up simple practical enquiries, comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support their findings.	• Ask questions about the world around them and explain that they can be answered in different ways. • Compare and group materials based on their magnetic properties. • Compare how objects move over surfaces made from different materials. • Explain that an object will not move unless a push or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force). • Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. • Investigate and compare a range of magnets (bar, horseshoe and floating) and explain that magnets have two poles (north and south) and that opposite poles attract each other, while like poles repel each other. • Make increasingly careful observations, identifying similarities, differences and changes and making simple connections. • Set up and carry out some simple, comparative and fair tests, making predictions for what might happen. • Take measurements in standard units, using a range of simple equipment. • Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	• How things move: move, movement, **surface**, distance, strength. • Types of **forces**: push, pull, contact force, non-contact force, **friction**. • **Magnets: magnetic, magnetic field,** magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic **poles** (north pole, south pole), **attract, repel,** compass. • Magnetic and non-magnetic materials: e.g. iron, nickel, cobalt. Previously introduced vocabulary: metal, names of materials.	**William Gilbert (1544 – 1603)** - http://www.bbc.co.uk/history/historic_figures/gilbert_william.shtml **Hans Christian Oersted (1777 – 1851)** - http://news.nationalgeographic.co.uk/news/2009/08/090814-hans-christian-orsted-oersted-who.html

Knowledge (specific knowledge)

- Questions can help us find out about the world and can be answered in different ways.
- Some materials have magnetic properties. Magnetic materials are attracted to magnets. All magnetic materials are metals but not all metals are magnetic. Iron is a magnetic metal.

Iron, cobalt, nickel and steel are magnetic metals.

- Friction is a force between two surfaces as they move over each other. Friction slows down a moving object. Smooth surfaces usually generate less friction than rough surfaces.

Friction is greater the rougher the surfaces.

- An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force.

Forces act in pairs that oppose each other. Forces cause objects to move, change speed or change shape.

- Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.

A bar chart displays information (data) as rectangular bars. A bar chart's vertical axis has a numerical scale, and its horizontal axis has values of something that has been investigated.

- Magnets have two poles (north and south). Opposite poles (north and south) attract each other, while like poles (north and north, or south and south) repel each other.

Magnetism is a non-contact force.

There are different types of magnets, such as horseshoe magnets, magnetic marbles, wand magnets and floating magnets. Magnets have different strengths.

- An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.

Magnets have invisible magnetic fields that can be seen using iron filings. Magnetic field lines emerge from a magnet's north pole then travel in an arc to a magnet's south pole. Magnetic force is stronger at the poles of a magnet.

- Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.
- Equipment is used to take measurements in standard units. Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C) and metre sticks (millimetres, centimetres and metres). Taking repeat readings can increase the accuracy of the measurement.

A force meter is a piece of equipment that measures a force or mass. Forces are measured in newtons (N). Mass is measured in kilograms (kg).

- Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.

The Earth acts like a huge bar magnet. It is surrounded by an invisible magnetic field called the magnetosphere, protecting it from the Sun's solar wind.

A navigational compass needle is magnetic and always points north.

Term 4

Rocks, relics and rumbles

- Compare and group together different kinds of rocks (including those in the locality) on the basis of appearance and simple physical properties **- Describe in simple terms how fossils are formed when things that have lived are trapped within rock** **- Recognise that soils are made from rocks and organic matter.** • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	• Compare and group rocks based on their appearance, properties or uses. • Describe simply how fossils are formed, using words, pictures or a model. Investigate soils from the local environment, making comparisons and identifying features. • Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. • Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.	• Types of rock: **sedimentary rock, igneous rock, metamorphic rock.** • **Properties of rocks: permeable,** semi-permeable, **impermeable,** durable. • Names of rocks: e.g. marble, chalk, granite, sandstone, slate. • Formation of rocks and fossils: natural, human-made, **magma, lava,** molten rock, **sediment, erosion, fossilisation,** layers, bone, fossil. • Soil: sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost. • Other: **palaeontology.** Previously introduced vocabulary: soil, **water**, air.	**Professor Ian Stewart** (contemporary geologist) **Adriana Ocampo (1955 -)** Space geologist http://iwaswondering.org/inez_homepage.html **Friedrich Mohs (1773-1839)** **Inge Lehmann (1888-1993)** **Alfred Wegener (1880 – 1930)** **Tuzo Wilson (1908- 1993)** **Marie Tharp(1920 – 2006)** **Dorothea Bate (1878 – 1951)** http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/dorothea-bate/index.html **William Smith (1769 – 1839)** http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/william-smith/index.html **Mary Anning (1799-1847)** http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/mary-anning/index.html **James Hutton (1726 – 1797)**

Knowledge (specific knowledge)

- There are three different rock types: sedimentary, igneous and metamorphic.
- Sedimentary rocks form from mud, sand and particles that have been squashed together over a long time to form rock. Examples include sandstone and limestone.
- Igneous rocks are made from cooled magma or lava. They usually contain visible crystals. Examples include pumice and granite.
- Metamorphic rocks are formed when existing rocks are heated by the magma under the Earth's crust or squashed by the movement of the Earth's tectonic plates. They are usually very hard. Examples include slate and marble.
- Fossils form over millions of years and are the remains of a once-living organism, preserved as rock. Scientists can use fossils to find out what life on Earth was like in prehistoric times. Fossils form when a living thing dies in a watery environment. The body gets covered by mud and sand and the soft tissues rot away. Over time, the ground hardens to form sedimentary rock and the skeletal or shell remains turn to rock.
- Soils are made from tiny pieces of eroded rock, air and organic matter. There are a variety of naturally occurring soils, including clay, sand and silt. Different areas have different soil types.
- Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.
- An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.

Term 5

Plant nutrition and reproduction

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers **- 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** **- Investigate the way in which water is transported within plants** **- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.** • Ask relevant questions and using different types of scientific enquiries to answer them. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Set up simple practical enquiries, comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support their findings	• Ask questions about the world around them and explain that they can be answered in different ways. • Describe the requirements of plants for life and growth (air, light, water, nutrients and room to grow) and how they vary from plant to plant. • Draw and label the life cycle of a flowering plant. • Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. • Investigate how water is transported within plants. • Make increasingly careful observations, identifying similarities, differences and changes and making simple connections. • Name and describe the functions of the different parts of flowering plants (roots, stem, leaves and flowers). • Set up and carry out some simple, comparative and fair tests, making predictions for what might happen. • Take measurements in standard units, using a range of simple equipment. • Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	• <u>Water transportation:</u> transport, **evaporation, evaporate, nutrients,** absorb, anchor. • <u>Life cycle of flowering plants:</u> **pollination** (insect/wind), pollen, nectar, pollinator, seed formation, **seed dispersal** (animal/wind/water), reproduce, **fertilisation,** fertilise, **stamen,** anther, filament, **carpel (pistil),** stigma, style, ovary, ovule, **sepal**, carbon dioxide. Previously introduced vocabulary: life cycle.	**Gregor Mendel (1822 -1884)**

Knowledge (specific knowledge)

- Questions can help us find out about the world and can be answered in different ways.

Pollination is the process where pollen grains are transferred from the stamen of one flower to the carpel of another of the same type. After pollination, seeds form in the carpel's ovary. A pollinator is an animal that pollinates flowering plants. Some plants are pollinated by the wind.

- Plants need air, light, water, minerals from the soil and room to grow, in order to survive. Different plants have different needs depending on their habitat. Examples include cacti, which need less water than is typical, and ferns, which can grow in lower light levels.
- Flowers are important in the life cycle of flowering plants. The processes of a plant's life cycle include germination, flower production, pollination, seed formation and seed dispersal. Insects and the wind can transfer pollen from one plant to another (pollination). Animals, wind, water and explosions can disperse seeds away from the parent plant (seed dispersal).

A life cycle is a series of changes that happen to a living thing during its lifetime. All plants have a life cycle.

- Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.
- Water is transported in plants from the roots, through the stem and to the leaves, through tiny tubes called xylem.

There are two main types of root systems. In a taproot system, a primary root grows deep into the soil. Lateral roots covered in tiny root hairs grow out from the sides of the taproot and take in water and nutrients from the soil. A fibrous root system grows just under the soil's surface from the plant's stem. Fibrous roots are covered in root hairs and spread far from the plant to take in water and nutrients. Aerial roots are unusual because they grow above ground.
Vascular plants contain tubes called vessels. Xylem carry water and nutrients. Phloem carry food made by the plant's leaves to where it is needed.

- An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.

The parts of a flower include the sepal, petal, stamen and carpel. The male stamen includes the anther and the filament. The female carpel consists of the stigma, style and ovary.

- The plant's roots anchor the plant in the ground and transport water and minerals from the ground to the plant. The stem (or trunk) support the plant above the ground. The leaves collect energy from the Sun and make food for the plant. Flowers make seeds to produce new plants.

Plant parts have specific functions. The stem transports water, nutrients and food around the plant. The leaves draw water and nutrients from the soil up through the roots and the stem of the plant. Seeds are dispersed away from the parent plant.Seed dispersal is the movement of seeds away from the parent plant.

- Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.
- Equipment is used to take measurements in standard units. Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C) and metre sticks (millimetres, centimetres and metres). Taking repeat readings can increase the accuracy of the measurement.

Leaves have two main functions. They capture energy from sunlight to make food through the process of photosynthesis, and they lose water in a process called transpiration, which causes water and nutrients to enter the root and move through the plant. The structure, shape, size and position of leaves help them carry out these functions.
Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.

Term 6
Light and shadows

- Recognise that they need light in order to see things and that dark is the absence of light **- Notice that light is reflected from surfaces** **- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes** **- Recognise that shadows are formed when the light from a light source is blocked by a solid object** **- Find patterns in the way that the size of shadows change.** • Ask relevant questions and using different types of scientific enquiries to answer them. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Set up simple practical enquiries, comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support their findings.	• Ask questions about the world around them and explain that they can be answered in different ways. • Describe the differences between dark and light and how we need light to be able to see. • Explain why light from the Sun can be dangerous. • Explain, using words or diagrams, how shadows are formed when a light source is blocked by an opaque object. • A shadow is formed when light from a light source, such as the Sun, is blocked by an object. Opaque objects cast dark shadows. Translucent objects cast pale shadows. Transparent objects cast very pale shadows. • Find patterns in the way shadows change during the day. • Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. • Group and sort materials as being reflective or non-reflective. • Make increasingly careful observations, identifying similarities, differences and changes and making simple connections. • Set up and carry out some simple, comparative and fair tests, making predictions for what might happen. • Take measurements in standard units, using a range of simple equipment. • Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	• **Light** and seeing: **dark,** absence of light, **light source,** illuminate, visible, **shadow, translucent,** energy, block. • **Light sources:** e.g. candle, torch, fire, lantern, lightning. • **Reflective light: reflect, reflection,** surface, **ray**, scatter, reverse, beam, angle, mirror, moon. • Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct. Previously introduced vocabulary: **opaque, transparent,** sunlight, sun.	**James Clerk Maxwell (1831– 1879)** - http://www.clerkmaxwellfoundation.org/html/who_was_maxwell_.html **Thomas Young (1773 – 1829)**

Knowledge (specific knowledge)

- Questions can help us find out about the world and can be answered in different ways.
- Dark is the absence of light and we need light to be able to see.

Light is a form of energy that travels in straight lines.

- Light from the Sun is damaging for vision and the skin. Protection from the Sun includes sun cream, sun hats, sunglasses and staying indoors or in the shade.

Opaque objects cast dark shadows. Translucent objects cast lighter, blurry shadows.

Shadows change when the light source or the object moves. For example, when a light source is lowered, shadows grow longer.

- Shadows change shape and size when the light source moves. For example, when the light source is high above the object, the shadow is short and when the light source is low down, the object's shadow is long.
- Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.

A light source produces light. A reflector reflects light. Light sources and reflectors can be natural, such as the Sun and Moon, or artificial, such as a light bulb or bike reflector.

- Light can be reflected from different surfaces. Some surfaces are poor reflectors, such as some fabrics, while other surfaces are good reflectors, such as mirrors.

Reflective materials are light in colour, shiny and smooth. Non-reflective materials are dark in colour, dull and rough.

- An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.

A shadow is made when an object blocks the passage of light from a light source. A shadow is the same shape as the object that casts it because light travels in straight lines. Shadows always appear on the opposite side of the light source.

- Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.
- Equipment is used to take measurements in standard units. Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C) and metre sticks (millimetres, centimetres and metres). Taking repeat readings can increase the accuracy of the measurement.
- Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.