PROGRESSION IN SCIENCE: KNOWLEDGE MILESTONES - SKILLS MILESTONES (YEAR BY YEAR)

EARLY YEARS

Understanding the World

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

ELG: The Natural World

Children at the expected level of development will:
- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Y1	Y2	Y3	Y4	Y5	Y6
**** In all cases staff should refer to the notes and guidance in the National Curriculum as an aide to each of the statements throughout this progression document.***					
SKILLS - WORKING SCIENTIFICALLY					
* Ask simple questions and recognise they can be answered in different ways. * Observe closely, using simple equipment. * Perform simple tests. * Identify and classify objects, items and living things. * Use observations and ideas to suggest answers to questions. * Gather and record data to help answer questions.		* Ask relevant questions and use scientific enquiry to answer them. * Set up simple practical enquiries, comparative and fair tests. * Make systematic and careful observations. * Take accurate measurements using standard units. * Use a range of measurement equipment including thermometers and data loggers. * Gather, record, classify and present data in a range of ways to help answer questions. * Record findings using simple scientific language, drawing, labelled diagrams, keys, bar charts and tables. * Report enquiry findings in oral, written, display or presentation form. * Draw simple conclusions from results. Make predictions, suggest improvements and raise further questions. * Identify differences, similarities or changes related to scientific ideas and processes. * Use straightforward scientific evidence to support findings or answer questions.		* Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. * Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. * Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. * Use test results to make predictions to set up further comparative and fair tests. * Report and present enquiry findings, conclusions, causal relationships, degree of trust in results – in oral, written, display or presentation form. * Identifying scientific evidence that has been used to support or refute ideas or arguments.	

PROGRESSION IN SCIENCE: KNOWLEDGE MILESTONES - SKILLS MILESTONES (YEAR BY YEAR)

KNOWLEDGE - LIVING THINGS & NATURAL WORLD

Y1

PLANTS

* 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.

ANIMALS INCLUDING 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).
* Describe, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Y2

LIVING THINGS & THEIR HABITATS

* 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.
* Describe how 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 simple food chains, identify and name different sources of food.

PLANTS

* 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.

ANIMALS INCLUDING HUMANS

* Notice 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, air).

* Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Y3

PLANTS

* Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
* 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.
* Know the requirements for plant life and growth (air, light, water, room to grow, nutrients from soil) and that they can vary from plant to plant.

ANIMALS INCLUDING HUMANS

* Identify that animals, including humans, need the right types of amount of nutrition, and that they cannot make their own food; they gain nutrition from what they eat.

* Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Y4

LIVING THINGS & THEIR HABITATS

* 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.

Recognising that environments can change and that this can sometimes pose danger to living things.

ANIMALS INCLUDING HUMANS

* Describe the simple functions of the basic parts of the digestive system in humans.

* Identify the different parts of teeth in humans and their simple functions.

* Construct and interpret a variety of food chains, identifying producers, predators and prey.

Y5

LIVING THINGS & THEIR HABITATS

* 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.

Y6

LIVING THINGS & THEIR HABITATS

* 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.

ANIMALS INCLUDING HUMANS

* Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
* Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
* Describe the ways in which nutrients and water are transported within animals, including humans.
* Describe changes to humans as they develop to old age. (Moved from Y5 as this fits ideally with this area of study.)

EVOLUTION & INHERITANCE

* 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.

PROGRESSION IN SCIENCE: KNOWLEDGE MILESTONES - SKILLS MILESTONES (YEAR BY YEAR)

KNOWLEDGE - MATERIALS & PROPERTIES

Y1	Y2	Y3	Y4	Y5	Y6
EVERYDAY MATERIALS * 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.	**USES OF EVERYDAY MATERIALS** * 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.	**ROCKS & FOSSILS** * Compare and group together different kinds of rocks on the basis of their 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.	**STATES OF MATTER** * 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.	**PROPERTIES & CHANGES OF MATERIALS** * Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. * 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. * Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. * 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 with burning and the action of acid on bicarbonate of soda.	

PROGRESSION IN SCIENCE: KNOWLEDGE MILESTONES - SKILLS MILESTONES (YEAR BY YEAR)

KNOWLEDGE - PHYSICAL PROCESSES

Y1

SEASONAL CHANGE

* Observe changes across the four seasons.

* Observe and describe weather associated with the seasons and how day length varies

Y2

Y3

LIGHT

* 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 an opaque object.
* Find patterns in the way that the size of shadows change.

FORCES & 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.

Y4

SOUND

* Identify how sounds are made, associating some of them with something vibrating.
* 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 the vibrations that produced it.
* Recognise that sounds get fainter as the distance from the sound source increases.

ELECTRICITY

* Identify common appliances that run on electricity.
* 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.
* Recognise some common conductors and insulators, and associate metals with being good conductors.

Y5

EARTH & SPACE

* 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.

FORCES

* 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.

Y6

LIGHT

* 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.
* Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
* Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

ELECTRICITY

* Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
* Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
* Use recognised symbols when representing a simple circuit in a diagram.

SCIENCE VOCABULARY

** Some vocabulary will be deliberately recurring 'sticky terms'. Others will be deliberately progressive or subject specific. This list is never exhaustive just a core starting point and should be open to addition throughout any study.*

Y1	Y2	Y3	Y4	Y5	Y6
		PLANTS **ANIMALS INCLUDING HUMANS** **ROCKS & FOSSILS** Sandstone, Limestone, Chalk, Granite, Slate, Marble, Survey, Petrologist, Data, Database, Erosion, Impermeable Seashell, Fossil, Sedimentary Rock, Formation. Ammonite, Minerals, Classify, Components, Sort, Micro-Organisms **FORCES & MAGNETS** Force, Push, Pull, Theory, Fair Test, Investigate, Measure, Gravity, Contact, Magnet, Magnetism, Results, Magnetic, Non-Magnetic, Attract, Attraction, Repel, Repulsion, North, South, Pole, **LIGHT**			**ELECTRICITY** bulb, battery, cell, wires, switch, motor, buzzer, circuit voltage, increase, decrease, circuit diagram **LIGHT** Light, reflection, reflect, travel, angle, incidence, straight line, light diagram, normal periscope, refraction, bend, lens, focus, focal point, transparent, refract, spectrum, wavelength, colour, prism, visible, rainbow, filter, see, absorb, shadow, source, opaque, size, distance, change, tilt, cast