Science

Science **Working Scientifically** Progression

	Nursery	Reception	Year 1	Year 2
Plan	(**Birth to 5 matters)** Range 5:Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. Talks about why things happen and how things work. Developing an understanding of growth, decay and changes over time.	**(Early Learning Goals)** 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.	ask simple questions	asking simple questions and recognising that they can be answered in different ways
Do	Shows care and concern for living things and the environment. Begin to understand the effect their behaviour can have on the environment		observing and using simple equipment performing simple tests with support identifying and classifying	observing closely, using simple equipment performing simple tests identifying and classifying
Record	Range 6: Looks closely at similarities, differences, patterns and change in nature.		gathering and recording data as a group	gathering and recording data to help in answering questions
Evaluate	Knows about similarities and differences in relation to places, objects, materials and living things . Talks about the features of their own immediate environment and how environments might vary from one another. Makes observations of animals and plants and explains why some things occur, and talks about changes .		begin to use their observations and ideas to suggest answers to questions	using their observations and ideas to suggest answers to questions

	Year 3	Year 4	Year 5	Year 6
Plan	asking questions and using different types of scientific enquiries to begin to answer them setting up simple practical enquiries and fair tests	asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests	planning different types of scientific enquires to answer questions	planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Do	making careful observations and, where appropriate, taking accurate measurements using a range of equipment, including thermometers gathering, recording and presenting data to help answer questions	making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	taking measurements, using a range of scientific equipment, with increasing accuracy, and with encouragement taking repeat readings	taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
Record	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	recording data and results using scientific diagrams and labels, classification keys, tables, bar and line graphs	recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Evaluate	reporting on findings from enquiries, including oral and written explanations using results to begin to draw simple conclusions, make predictions and raise further questions identifying differences and similarities related to simple scientific ideas to begin to use straightforward scientific evidence to answer questions	reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.	to begin to use test results to make predictions to set up further comparative and fair tests reporting findings from enquiries, including conclusions and explanations, in oral and written forms identifying scientific evidence that has been used to support ideas	using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments

Science Progression: plants

Year 1

Can identify and name a variety of common wild and garden plants, including deciduous and evergreen.

Can identify and describe the basic structure of a variety of common flowering plants, including trees

Year 2

Can observe and describe how seeds and bulbs grow into mature plants

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

Year 3

Can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.

Can 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.

Can investigate the way in which water is transported within plants.

Can explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Year 4

Year 5

Can describe the life process of reproduction in some plants and animals

Year 6

Can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

Can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Science Progression: animals including humans

Year 1

Can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.

Can identify and name a variety of common animals that are carnivores, herbivores and omnivores

Can describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).

Can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Year 2

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 and air)

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

Year 3

Can 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.

Can identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Year 4

Can describe the simple functions of the basic parts of the digestive system in humans.

Can identify the different types of teeth in humans and their simple functions.

Can construct and interpret a variety of food chains, identifying producers, predators and prey.

Year 5

Can describe the changes as humans develop to old age

Year 6

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

Can recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

Can describe the ways in which nutrients and water are transported within animals, including humans

Science Progression: materials

Year 1

Can distinguish between an object and the material from which it is made

Can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.

Can describe the simple physical properties of a variety of everyday materials.

Can compare and group together a variety of everyday materials on the basis of their simple physical properties.

Year 2

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

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

Year 3

Year 4

Can compare and group materials together, according to whether they are solids, liquids or gases

Can 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 (°C)

Can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Year 5

Can 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.
Can name some materials that will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

Can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

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

Can demonstrate that dissolving, mixing and changes of state are reversible changes.

Can 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.

Year 6

Science Progression: living things and their habitats

Year 1

Year 3

Year 5

Can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.

Can describe the life process of reproduction in some plants and animals.

Year 2

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

Can 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

Can identify and name a variety of plants and animals in their habitats, including micro-habitats.

Can 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.

Year 4

Can recognise that living things can be grouped in a variety of ways (mammals, amphibian, reptiles, birds, fish)

Can explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

Can recognise that environments can change and that this can sometimes pose dangers to living things

Year 6

Can describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.

(Just recap on mammals, amphibian, reptiles, birds, fish)

Can give reasons for classifying plants and animals based on specific characteristics

Science Progression: light and sound

Year 1

A non-statutory exploration unit will be taught to introduce children to the concept of Light .

Year 2

A non-statutory exploration unit will be taught to introduce children to the concept of Sound .

Year 3: light

Can recognise that they need light in order to see things and that dark is the absence of light.

Can notice that light is reflected from surfaces.

Can recognise that light from the sun can be dangerous and that there are ways to protect their eyes.

Can recognise that shadows are formed when the light from a light source is blocked by a solid object.

Can find patterns in the way that the size of shadows change.

Year 4: sound

Can identify how sounds are made, associating some of them with something vibrating.

Can recognise that vibrations from sounds travel through a medium to the ear.

Can find patterns between the pitch of a sound and features of the object that produced it.

Can find patterns between the volume of a sound and the strength of the vibrations that produced it.

Can recognise that sounds get fainter as the distance from the sound source increases.

Year 5:

Year 6: light

Can 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.

Can 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.

Can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Science Progression: electricity and forces

Year 1

A non-statutory exploration unit will be taught to introduce children to the concept of Forces .

Year 2

Year 3: forces and magnets

Can compare how things move on different surfaces.

Can notice that some forces need contact between two objects, but magnetic forces can act at a distance.

Can observe how magnets attract or repel each other and attract some materials and not others describe magnets as having two poles.

Can predict whether two magnets will attract or repel each other, depending on which poles are facing.

Can 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: electricity

Can identify common appliances that run on electricity.

Can construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.

Can 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.

Can recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.

Can recognise some common conductors and insulators, and associate metals with being good conductors.

Year 5: forces

Can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

Can identify the effects of air resistance, water resistance and friction, that act between moving surfaces.

Can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Year 6: electricity

Can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.

Can 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.

Can use recognised symbols when representing a simple circuit in a diagram.

Science Progression: standalone units

Year 1: seasonal changes

Can observe changes across the four seasons.

Can observe and describe weather associated with the seasons and how day length varies.

Year 3: rocks

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

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

Can recognise that soils are made from rocks and organic matter

Year 5: Earth and space

Can describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

Can describe the movement of the Moon relative to the Earth.

Can describe the Sun, Earth and Moon as approximately spherical bodies.

Can use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Year 2

Year 4

Year 6: evolution and inheritance

Can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

Can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

Can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Science Progression: Knowledge Vocabulary

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants— leaf, flower, petal, fruit, root, seed, trunk, branch, stem, bark,	**Plants**— seed, bulb, germinate, seedling, bud, flower, fruit, berry, root, temperature	**Plants**– stem, trunk, leaves, pollination, seed formation, seed dispersal,			
Animals (Inc. Humans) - head, body, eyes, ears, mouth, teeth, elbows, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, touch, see, smell, taste, hear, nose, tongue	**Animals (Inc. Humans)** - offspring, reproduction, growth, exercise, breathing, hygiene, germs, toddler, adult	**Animals (Inc Humans)** - nutrition, nutrients, carbohydrates, routines, vitamins, minerals, fibre, skeleton, bines, muscles, joints	**Animals (Inc Humans)** - digestive system, digestion, herbivore, carnivore, omnivore, detritivore, producer, consumer, predator, prey, food chain, incisor, canine, premolar, molar	**Animals (Inc Humans)** - life cycle, puberty, sexual reproduction, menstruation, sperm, egg, foetus, gestation	**Animals (Inc Humans) -** heart, pulse, blood, blood vessels, lungs, circulatory system, diet, exercise, drugs, lifestyle
	Living things and their habitats— living, dead, never been alive, habitat, micro-habitat, food chain		**Living things and their habitats**— classification, classification key, environment, habitat, vertebrates, invertebrates, amphibian, reptile, mammal, bird, fish	**Living things and their habitats**— life cycle, reproduction, sexual reproduction, asexual reproduction, fertilise, runner, bulb, cutting, tuber, mammal, amphibian	**Living things and their habitats**— vertebrate, invertebrate, amphibian, reptile, mammal, classifying, micro-organisms
Materials— object, material, wood, plastic, glass, metal, water, rock, hard, soft, stretchy, stiff, bendy, not bendy, waterproof, not waterproof, rough, smooth, shiny, dull, opaque, transparent	**Uses of everyday materials**—wood, metal, plastic, glass, brick, rock, paper, cardboard, transparent, translucent, opaque, flexible, rigid, reflective, non-reflective, absorbent, solid		**States of Matter**– solid, liquid, gas, change of state, melting, freezing, melting point, boiling point, evaporation, condensation, water cycle, temperature	**Properties and changes of materials**—thermal insulator, thermal conductor, electrical insulator, electrical conductor, dissolve, solution, soluble, insoluble. Substance, sieve, filter, evaporation, reversible change, non-reversible change	

Science Progression: Knowledge Vocabulary

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Forces and Magnets—force, magnetic force, magnet, attract, repel, poles, contact force, non-contact force		**Forces**—force, gravity, force meter, Newton (N), air resistance, water resistance, friction, mechanisms, levers, pulleys, gears	
		Light—light, dark, light source, transparent, translucent, opaque, shadow, reflect, mirror			**Light**—light source, light ray, reflect, shadow, cast, opaque
			Electricity—electricity, electrical appliances. mains, circuit, cell/ battery, switch, con-		**Electricity**—simple series circuit, component, symbol, circuit diagram, cell/ battery, switch, voltage
Seasons— weather , sunny, rainy, windy, snowy, Winter, Summer, Spring, Autumn, sun, sunrise, sunset,		**Rocks**—rock, fossil, soil, decayed, minerals, grains, crystals, sedimentary	**Sound**—sound, sound source, vibrations, pitch, volume, sound insulation	**Earth and Space**—earth, sun, moon, planets, solar system, star, rotate, orbit, spherical	**Evolution & Inheritance**—evolution, offspring, inherited, characteristics, variation, adapted, environment, fossil, species

Science Progression: Working Scientifically Vocabulary

Key Stage 1:

Question

Questioning

Observe

Record

Identify

Group

Classify

Sort

Diagram

Table

Data

Lower Key Stage 2:

Relevant Questions
Prediction
Plan
Observations
Record
Research
Enquiry
Comparative
Fair
Accurate
Measurements
Classify
Keys
Diagrams
Graphs
Charts
Tables
Conclusion
Explanation

Upper Key Stage 2:

Prediction
Plan
Variables
Observations
Record
Repeat
Identify
Comparative
Fair
Accurate
Precise
Scientific Diagrams
Classification keys
Systematic
Graphs (scatter, line, bar)
Patterns
Interpret
Conclusion
Explanation
Relationships
Evidence
Validity