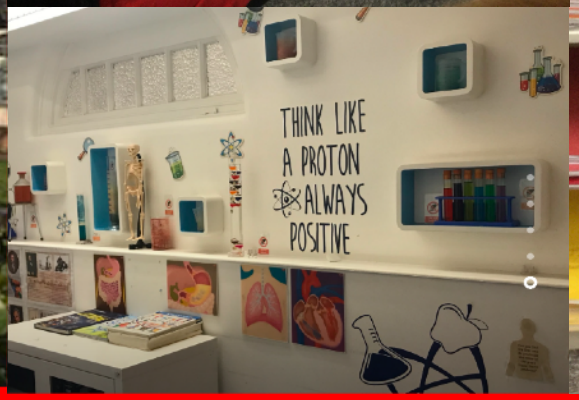
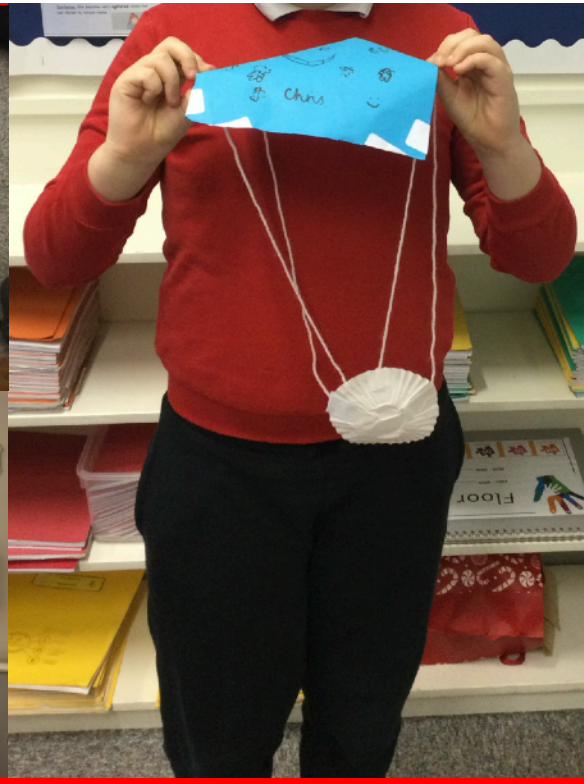
Science Curriculum Overview

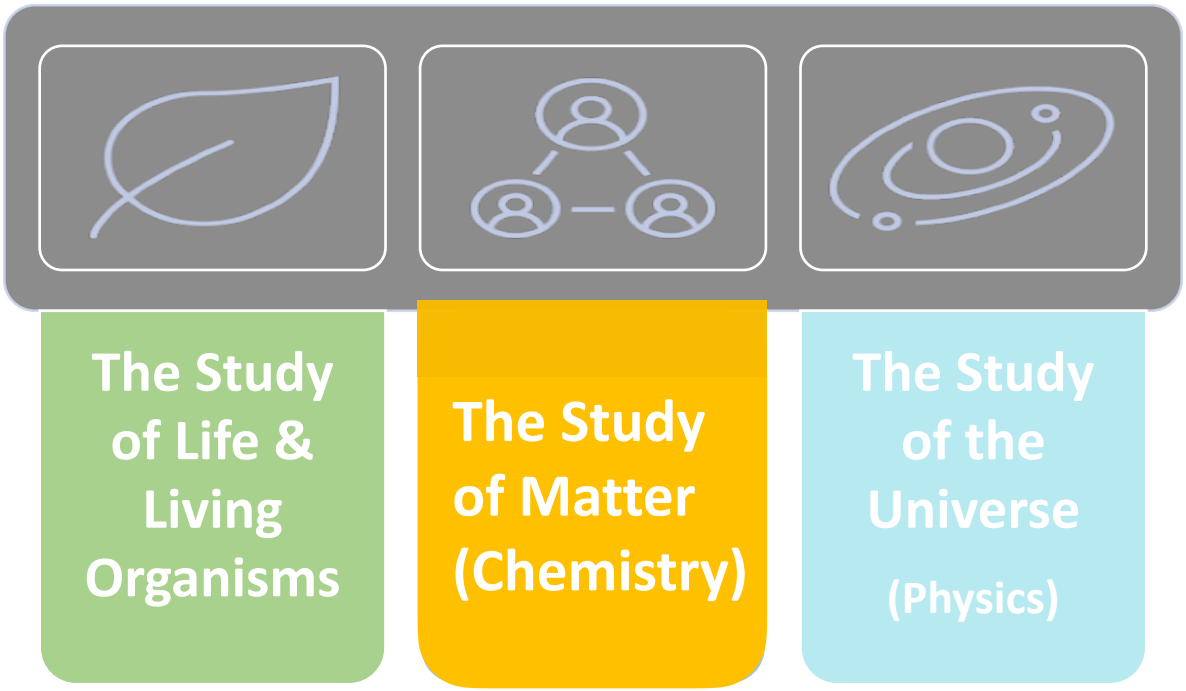




"A caring community: Serious about learning"

Our Approach

We have used **Switched on Science** as the base for our **cyclical** curriculum, which weaves **working scientifically** through the 3 branches of Natural Sciences below. Our pupils revisit these aspects throughout their time in our school. The 6 elements of **working scientifically** are: **observing over time, pattern seeking, identifying, classifying/grouping, comparative/fair testing and researching using secondary sources.** Within each unit we have identified the working scientifically element that is the main focus. We have also ensured that working scientifically skills are **embedded and built upon** across each phase. Each time they revisit an aspect, it is with **increasing complexity** to build on their **prior knowledge**. In each year group starting in Y1, children learn about the work of **3 prominent scientists** to build up an overview of different people and the impact of their work on society. Science is **taught weekly for 1 hour** from Y2-Y6 and Y1 from Summer 2. Across 6 half termly topics they complete an investigation to put into practice and apply their working scientifically skills in the context of the topic. In EYFS, and Y1 up to Summer 1, children start to build the foundations of science knowledge and working scientifically elements through interleaved shorter foci, alongside continuous provision. From Reception to Y6 we have identified the **key vocabulary** that children will be introduced to.



Our curriculum is designed to enable our children to work towards an understanding of the following 'big ideas' in science. This cumulative knowledge is developed over time in appropriate, age-related steps.

By the time a child reaches Y6 we expect them to have some understanding of the following:

1. All material in the Universe is made of very small particles.
2. Objects can affect other objects at a distance.
3. Changing the movement of an object requires a net force to be acting on it.
4. The total amount of energy in the Universe is always the same but energy can be transformed when things change or are made to happen.
5. The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth's surface and its climate.
6. The solar system is a very small part of one of millions of galaxies in the Universe.
7. Organisms are organised on a cellular basis.
8. Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.
9. Genetic information is passed down from one generation of organisms to another.
10. The diversity of organisms, living and extinct, is the result of evolution.

Working with Big Ideas of Science Education, edited by Wayne Harlen, 2015

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Pre skills	* using all senses in the exploration of materials and their environment * grow plants and observe them over time * name common animals - pets and local environment * talk about what they see, hear, smell, taste and feel using introduced vocabulary * explore a wide range of natural and man-made materials * develop sorting skills in preparation for understanding similarities and differences
YR	
Knowledge & Skills	**Plants** * To learn about the life cycle of a bean * To grow a bean and make observations of its growth * To name the parts of a plant - flower, petal, leaf, stem, roots * To compare similarities and differences between different plants * (art link) To make observational drawings of plants **Animals** * To learn about the life cycle of a chicken * To observe the hatching of chicks * To observe farm animals and learn the names of adult and baby animals * To learn about animals that come from different places: Australia - kangaroo, koala, dingo, wombat Sweden - reindeer, moose **Humans** * To learn how to care for our own bodies * (PSHE link) To name parts of the body including private parts * To learn what it means to be healthy - safety, eating, sleeping and exercise **Habitats** * To observe and describe habitats within the school grounds * To learn about contrasting habitats: Australia - desert, beach Sweden - forest, mountain **Materials** * To explore and name man-made and natural materials * To describe and sort by the properties of materials * (history link) To compare the use of materials in toys now and in the past * To explore the changing state of eggs * To explore the changing state of ice **Universe** * To know what a shadow and rainbow are * To learn how shadows and rainbows are formed * (DT link) To explore the effect of forces - wind power and buoyancy in relation to boat making

Knowledge & Skills	**Seasons** - people, plants, animals, weather (repeated over the 4 seasons) * To explore the local environment in each season * To show care and concern for living things * To observe the changes to plants over the seasons * To learn about different plants across the seasons: Autumn - sunflower, viola Winter - poinsettia, snowdrop Spring - daffodil, bluebell Summer - daisy, buttercup * To learn about different trees across the seasons: apple and pear trees evergreen - fir, ivy * To learn about the changes to animals over the seasons - hedgehogs, geese, bees and worms * (geography link) To learn about the changes to weather over the seasons * (RE link) To learn about what people are doing / wearing in each season
V	seed / plant / flower / soil / water / sun / leaf / leaves / fruit / petal / bud / blossom / stem / root egg / chick / chicken / hen / bird / wing / beak / lifecycle / grow / change / die human / body parts / safe / healthy / exercise habitat / desert / beach / forest / mountain / hot / cold / wet / dry material / wood / paper / plastic / metal / cardboard / fabric / glass / dull / shiny / bendy / stiff / hard / soft / smooth / rough / waterproof hot / warm / cold / melt / wet / dry / ice / change / change back / solid / liquid wind / air / blow / fast / slow / turn / spin / shadow / rainbow Autumn / Winter / Spring / Summer / season / hibernate / evergreen / migrate / weather
	Continuous Provision Enhancements • Opportunities to observe and care for plants in the setting • Opportunities to draw plants independently • Opportunities to explore other life cycles • Small world set ups of different places / habitats • Small world animals from different places / countries • Role play food and other props to make healthy meals • Gross motor opportunities to exercise and develop healthy approach to keeping fit • Opportunities to explore, sort and use a range of different materials • Opportunities to explore forces including buoyancy, wind power, gravity and magnets • Opportunities to test ideas, question, measure, record, compare, observe, evaluate

Y1		Summer 2
Knowledge & Skills	**Animals including humans - humans** • Identify, name, draw and label the basic parts of the human body. • Say which part of the body is associated with each sense. **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. **Animals including humans - polar** • 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 • (materials extension) compare and group together a variety of materials on the basis of their simple physical properties **Animals including humans - our locality** • 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) <u>Specific animals in our locality:</u> Pond – pond skater, backswimmer, dragonfly Forest school – ladybird, woodlouse, slug, snail, ant, spider, fox, caterpillar to butterfly Birds – Robin, blue tit, magpie, pigeon Pets – cat, dog, rabbit, hamster **Animals including humans - insect safari** • Identify and name a variety of common animals including fish, amphibians, reptiles, birds, mammals and insects. • 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, mammal and insects)	**Animals Including Humans - marine** • 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 or omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals). • 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. habitat / marine biologist / banded wedge shell / cockle / limpet / mussel / periwinkle shell / pollution / protect / razor clam / recycle / rock pool / rubbish / sand / sea / shell / shell crab / sunburn /sunglasses / sunscreen / turtles

K & S	**Seasons** - weather and plants (repeated over the 4 seasons) • To observe changes across the 4 seasons • To observe and describe weather associated with the seasons and how day length varies • 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 <u>Specific plants in our school to name:</u> <u>Wild plants –clover, poppies, bluebells</u> Garden plants –crocus, Water lily (pond) Deciduous trees – oak, rowan, willow, cherry + purple leaf sand cherry, horse chestnut Evergreen - bamboo, cedar (2 varieties), Fir, Ivy (evergreen plants)
V	backbone / chin / ears / elbow / eye socket / eyes / fingers / foot / feet / head / hear / hearing / hip / human / joints / knee / leg / neck / nose / ribs / see / senses / sight / smell / spine / taste / thigh / toes / tongue / touch / vertebrae / wrist adventurer / Antarctic / Arctic / carnivore / clothes / cold / explorer / freeze / frozen / herbivore / ice / icebergs / North Pole / omnivore / penguin / polar bear / sea lion / seal / snow / South Pole / warm / waterproof / weather / whale / habitat animals / birds / buds / feed / habitat / identify / leaves / live / nest / plants / sort / tree / twigs / amphibians / fish / flowers / identify / mammal / reptile / stem / tree bark / battery / bright / bulb / candle / cool / dark / dull / fast / flame / flower / fruit / high / hot / leaf / leaves / light / liquid / loud / low / mirror / observe / plant / quiet / root / senses / shoot / slow / solid / texture / torch / wax / wick / illuminate / light source / opaque / reflect / translucent / transparent / shadow / sound / source of sound / vibration abdomen / antennae / detritivore / exoskeleton / eyes / food chain / habitat / head / insect / invertebrate / jointed / key / legs / metamorphosis / pond / sections / thorax / vertebrate
	Prominent scientists: Linda B. Buck (USA 1947-present) biologist Dr. Percy Julian (1899-1975 - United States) Chemist Jane Goodall (1934-present United Kingdom) zoologist
	Continuous Provision Enhancements: • Opportunities to explore recently introduced knowledge or skills • Opportunities to learn and embed new vocabulary • Small world and role play opportunities to develop ideas and embed vocabulary • Opportunities to test ideas, question, measure, record, compare, observe, evaluate

Y2	Autumn		Spring		Summer	
Knowledge & Skills	Animals Including Humans Healthy Me! • Understand that animals, including humans, have offspring which grow into adults • 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	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.	Materials Squash, Bend Twist and Stretch • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Living Things Our Local Environment • 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, and how they depend on each other • Identify and name a variety of plants and animals in their habitats, including micro-habitats SEE YEAR 1 LIST • 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	Plants Young Gardeners • 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 • Revisit and extend names of plants found in local area.	Animals Including Humans Little MasterChef's • Find out about and describe the basic needs of humans for survival (water, food and air). • Describe the importance for humans of eating the right amounts of different types of food, and hygiene. • Observe and describe how seeds and bulbs grow into mature plants. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

	Stephanie Kwolek (1923-2014 - United States) chemist		Al Jahiz (776 AD- 868 AD Iraq) biologist and zoologist		Barbara McClintock (1902- 1992 UAS) geneticist	
WS	pattern seeking	identifying, classifying/grouping	comparative/fair testing	researching using secondary sources	observing over time	observing over time
Vocabulary	calm / calves / cough / exercise / feed / fitness / food / fruit / germs / happiness / health / healthy / hygiene /hygienic / muscle / needs / sneeze / stomach / thighs / vegetables / adult / baby / basic needs (water, food, air) / carbohydrate / child / dairy / exercise / fats / fruit / grow / infection / offspring / oils, proteins / sugar / survival / vegetables / teenager / toddler / unhealthy	hard / gas / glass / liquid / rock / soft / solid / stiff / transparent / waterproof / properties, reflection / absorbent / bend / brittle / bumpy / card / change / concrete / dull / elastic / fabric / flexible / glass / hard / man-made materials / metal / natural materials / opaque / paper / plastic / recycle / rough / rubber / shiny / smooth	changes / concrete / elastic / fabric / flexible / man-made / material / natural / opaque / properties / reflective / rigid / rubber / shape / squash / stretch / strong / suitable / translucent / transparent / twist / use/ useful / weak / characteristics / suitability / purpose	adaptation / alive / breathe / carnivore / conditions / characteristics / dead / excrete / feed / food chain / grow / heat / herbivore / living / micro-habitats / move / non-living / omnivore / reproduce / shelter / names of habitats/ prey / predator / never alive	annual / compost / flower / fruit / germinate / germination / fruit / health / healthy / leaf / plant / root / seed / seedling / soil / stem / vegetable / properties / materials / bulb / leaves / tuber / corms	bones / bread / change / chopping board / cook / dehydrate / digest / energy / fork fruit / frying pan / grow / heat / hot / hygiene / ingredients / knife / oven / rainbow / saucepan / spoon / strong / temperature / utensils / vegetables / whisk

Y3	Autumn		Spring		Summer	
Knowledge & Skills	Rocks, Soils and 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	Animals Including Humans-Healthy Eating • 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	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	Plants How does your garden grow? • 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.	Light and Shadow • 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 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	Animals Including Humans-Skeletons • Identify that humans and some other animals have skeletons and muscles for support, protection and movement

	Mary Anning (1799-1847 – United Kingdom) palaeontologist Flemmie Pansy Kittrell (1904-1980 – USA) nutritionalist		Joseph Banks (1743-1820 UK) plant biologist		Attraction dance group (Hungary) Valerie Thomas (1943- USA) data scientist and inventor	
WS	identifying, classifying/grouping	researching using secondary sources	identifying, classifying/grouping pattern seeking	Observing overtime	Comparative fair testing	researching using secondary sources
Vocabulary	absorb / extinct / crystals / fossils / granite / grains / humus / igneous / impermeable / layers / magma / metamorphic / mineral / molten / palaeontology / palaeontologists / permeable / rock / sediment / sedimentary / soil, erosion / particles / physical properties / porous / marble / sand / clay / limestone	balanced diet / blood vessels / brain / carbohydrate / dietary fibre / heart / minerals / vitamins / nutrients / fats / protein	air resistance / attract / bar magnet / button magnet / compass / contact / float / force / force-meter / friction / gravity / horse shoe magnet / iron / magnet / magnetic / magnetic North / non-contact / non-magnetic / North pole / poles / repel / ring magnet / sink / South pole / strength	carpel / flower / germinate / leaves / life cycle / nutrients / ovary / ovule / petal / photosynthesis / pollen / pollination / root / root hairs / seed dispersal / sepals / stamen / stem / style / stigma / veins	absorb / beam / block / direction of light / bright / dim / dull / light / source / mirror / opaque / reflect / reflective / shadow / shiny / sun light / translucent / transparent / names of light sources / speed of light / emit / light spectrum	support / protection / ribs / sockets / skeleton / skull / spine / tendons / vertebrates / triceps / femur / humerus / exoskeleton / nutrition / biceps / contract / relax / backbone / bones / invertebrates / joints / movement / muscles

Y4	Autumn		Spring		Summer	
Knowledge & Skills	Materials- Looking at states • 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 (°C) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Electricity Power it up • 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 conductor	Animals Including Human Digestive System & Teeth • Describe 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 • Construct and interpret a variety of food chains, identifying producers, predators and prey	Animals Including Human Food Chains • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (refer back to names covered in KS1) • Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things. • Understand what a food chain is. • Explain/give examples of simple food chains and how they impact.	Sound What's that 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	Living Things Habitats • Recognise that living things can be group 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. • Identify the changes in the habitats within the school grounds. • Recognise that environments can change and that this can sometimes pose dangers to living things. • Explore the impact of humans both positive/ negative on habitats.

	Walter Lincoln Hawkins (1911-1992 – USA) chemist and engineer		William Beaumont (1785-1853 – USA) Surgeon		Sir David Attenborough (1926-present - United Kingdom) biologist	
WS	Observing over time	comparative/fair testing	researching using secondary sources	identifying, classifying/grouping	Pattern seeking	identifying, classifying/grouping
Vocabulary	air / boiling point / boiling / condensation/ condensing / degree Celsius / energy transfer / evaporation/ evaporation / freezing / freezing point / gaseous / grain / matter / melting / melting point / oxygen / particles / powder / water cycle / water vapour	battery / bulb / buzzer / cell / circuit / closed circuit / components / complete circuit, / conductor / connection / crocodile clip / electricity / electrical device/ appliance / insulator / mains / motor / negative / open circuit / plug / positive / rechargeable / simple circuit / symbol, / switch / terminals / wires / series circuit	absorb / anus / blood stream / canines / consumer / decay / dentine / digestion / enamel / energy / faeces / gums / incisors / large intestine / molars / nerves / oesophagus / plaque / saliva / small intestines / stomach / swallowing/ carnivores / herbivore / nutrients	fish/ reptiles / mammals / birds / amphibians / snails / slugs / worms, / spiders / insects / environment / habitat / vertebrate / invertebrate / exoskeleton / adaptation / predator / prey / producer	brass / echo / insulation / instrument / percussion / pitch / sound source / sound wave / string / travel / tune / tuning fork / vibration / volume / woodwind	organisms / life processes / environment / extinct / habitat, / characteristics / impact / positive / negative, human / amphibian / bird / centipede / classify / fish / flowering plant / insect / invertebrate / key / mammal / reptiles / vertebrate

Y5	Autumn		Spring		Summer	
Knowledge & Skills	Earth & Space Out of this World • 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 Gravity • Understand that unsupported objects fall to Earth due to gravity. (Parachutes & seeds) • Explore the effects of air resistance, water resistance and friction as forces between moving surfaces. (breaks on wheels) • Investigate how mechanisms such as levers, pulleys and gears allow a smaller force to have a greater effect.	Animals Including Humans Growing up and Growing old • Describe the changes as humans develop to old age	Living Things Circle of Life • 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	Materials Material World • 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 • Recognise 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 associated with burning and the action of acid on bicarbonate of soda.	Materials Amazing Changes • 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.

	Alhazen (Ibn al-Haytham) (965-1040 - Iraq) mathematician and astronomer Mae Carol Jemison (1956- present USA) engineer		Dr Steve Jones (1944- present UK) biologist Professor Robert Winston (1940- present UK) biologist		Amedeo Avogadro (1776- 1856 Italy) physicist	
WS	researching using secondary sources	comparative/fair testing	pattern seeking	identifying, classifying/grouping	observing over time	observing over time
Vocabulary	asteroids / axes/Axis / celestial body / comets / galaxy / light years / meteors / orbit / phases of the moon / planet / revolve / rotation / shadow clocks / spherical / spin / solar system / star / sun / sundials / time zone / heliocentric / geocentric / daytime / night-time	gravity / air resistance / water resistance / friction / surface / force / effect / move / associate / decelerate / stop / change direction / brake / mechanism / pulley / gear, / spring / theory of gravitation / Newton / force meter / non-contact force / weight / mass / reliable	adolescence / adolescent / adult / arthritis / gestation period / life expectancy / menstruation / pregnant / puberty / teenager	anther / asexual reproduction / carpel / external fertilisation / fertilisation / filament / germination / gestation / internal fertilisation / larva / metamorphosis / pollen / pollination / seed dispersal / seed formation / sepal / sexual reproduction / sperm / stamen / style / stigma	burning / dissolve / electrical conductor / filter / insoluble / irreversible change/ mixture / reversible change / rust / sieving /soluble / solute / solution / solvent / thermal conductor / thermal insulator / combustion / oxidisation / chemical reaction / residue / filtrate/ evaporate / flexible / hard / plastic / rigid / strong / tough	burning / acid / irreversible/chemical change / reversible/ physical change / rust

Y6	Autumn		Spring	Summer	
Knowledge & Skills	Animals Including Humans-Circulatory System • 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	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	Living Things-Classifying • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution *(Extends y3 – requirements for life and growth)* • Classifying plants (Linked to Year 4 learning) • 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.	Evolution and 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.	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

	Aristotle (384-322 BCE – Greece)		Carl Linnaeus (1707-1778 - Sweden) biologist	Charles Darwin (1809- 1882 UK) naturalist Masatoshi Nei (1931-2023 – Japan/USA) biologist Kumi Yamashita (1968- Japan/USA) shadow artist	
WS	pattern seeking	comparative/fair testing	identifying, classifying/grouping	researching using secondary sources	observing over time
Vocabulary	addiction / aorta / artery / atrium / blood / bronchi / capillaries / carbon dioxide / circulatory system / de-oxygenated / diaphragm / lifestyle / lungs / nicotine / oxygen / oxygenated / plasma / pulmonary vein /artery / pulse / red blood cells, / respiration / vein / ventricles / white blood cells / heart	battery / blow / cell / current / complete / component / electrons, filament / fuse / resistance series circuit / terminal / voltage volume / parallel circuit	classification / mammals / birds / amphibians / fish / reptiles / insects / vertebrates / invertebrates / micro-organisms, bacteria, fungi/ fauna / fermentation / flora / genus / microbe / mushroom / species / toadstool	adaptation / chromosomes / competition / DNA / evolution / evolutionary change features / environmental conditions / environmental variations / fossil records / genes / natural selection / reproduction / survival of the fittest / variation / inherited / prehistoric / variety	absorption / cornea / lenses / lens / iris / light ray / optics / pupil / prism / rainbow / refraction / reflection / symmetry / spectrum / transmission

Our Working Scientifically Progression

Key Area	EYFS	Y1	Y2	KS2			
Observing Overtime	Know that observation is a key skill of a scientist. Know that comparisons can be made through observation.	Know that observations can be made using simple equipment. Know that changes can be recorded through observation.	Know that equipment can be selected to observe change over time. Know that observations can be measured.	Know that observations need to be careful and systematic.	Know that choices can be made on what to observe and how to measure it. Know that standard units of time in minutes and seconds can be used when accurately observing.	Know that observations can be made on a variety of scientific activities. Know that times of observation will vary according to the requirements each experiment.	Know that observations require: identifying the measurements required, selecting the equipment needed and taking precise readings. Know that the interval and range can be taken from a set of observations.
Pattern Seeking	Know that patterns exist within scientific phenomena.	Know that patterns can be identified within scientific phenomena.	Know that relationships can be identified within scientific phenomena.	Know that patterns can be naturally occurring. Know that conclusions can be formed based on findings. Know that a range of bar charts, tables and pictograms are used to show measurements.	Know that patterns can be identified in results. Know that patterns can be identified through data collection.	Know that causal relationships can be identified. Know that data can be interpreted to find patterns. Know that data can be gathered, recorded, classified and presented in a variety of ways which include scientific diagrams, labels, keys, graphs and tables.	Know that patterns can be found in the natural environment. Know that evidence can support / refute causal relationships.

Identifying, Classifying and Grouping	Know that living and non-living things can be grouped.	Know that living and non-living things can be classified and compared.	Know that living and non-living things can be classified and compared through methods of sorting and grouping.	Know that identified criteria will determine how living and non-living things are classified. Know that keys can be used when grouping, sorting and classifying.	Know that scientific ideas and processes determine how living and non-living things are classified and sorted.	Know that scientific ideas and processes determine how living and non-living things are classified and sorted.	Know that own classification methods can be chosen and developed in order to sort living and non - living things.
Comparative/Fair Testing	Know that we can investigate different areas of science practically. Know that objects, materials and living things can be explored scientifically. Know that simple predictions can be made.	Know that patterns can be found in the natural environment. Know that evidence can support / refute causal relationships.	Know that explanations can be made based on what has happened during an investigation. Know that simple tests can be carried out independently.	Know that an investigation includes simple, practical enquiries. Know that measurements can be taken using a range of equipment. Know that comparative tests can be carried out.	Know that there is more than one variable. Know that fair tests can be carried out.	Know that some variables need to be controlled. Know that results can lead to further prediction and the design of further comparative tests. Know that methods can be improved.	Know that there are explanations behind needing to control variables. Know that there are reasons for improving methods. Know that the correct units must be used when measuring accurately and precisely.
Researching Using Secondary Sources	Know that questions can be asked to find answers.	Know that simple secondary sources can be used to find answers.	Know that questions can be researched to find answers.	Know that questions can be researched to find answers using secondary sources	Know that answers to questions using secondary sources can be reported in different ways.	Know that repeated and precise recordings must be taken. Know that research can be presented in different formats.	Know that research can be presented using different formats, selecting the best format for the information being shared.

End point	A Reception child working at the expected standard can: 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. (ELG's: Understanding the World)	A Year 1 child working at the expected standard can ask simple questions. They can observe closely, using simple equipment performing simple tests. They can identify and classify using their observations and ideas to suggest answers to questions. They can gather and record data to help in answering questions.	A Year 2 child working at the expected standard can ask questions and recognise that they can be answered in different ways. They can observe closely, using simple equipment performing simple tests. They can identify and classify using their observations and ideas to suggest answers to questions. They can gather and record data to help in answering questions.	A Year 3 child working at the expected standard can ask relevant questions and use different types of scientific enquiries to answer them. They can set up simple practical enquiries. They can set up fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units. They can use a range of equipment, including thermometers. They can gather, record, classify and present data in a variety of ways to help in answering questions. They can record findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. They can report on findings from enquiries, including oral and written explanations. They can use results to draw simple conclusions, make predictions, suggest improvements, and raise further questions.	A Year 4 child working at the expected standard can: ask relevant questions and use different types of scientific enquiries to answer them. They can set up simple practical enquiries. They can set up comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units. They can use a range of equipment, including thermometers, gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. They can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. They can report on findings from enquiries, including oral and written explanations, displays or presentations of results. They can use results to draw simple conclusions, make predictions, suggest improvements, and raise further questions. They can identify differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.	A Year 5 child working at the expected standard can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. They can take measurements, using a range of scientific equipment, taking repeat readings when appropriate. They can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. They can use test results to make predictions to set up further comparative and fair tests. They can report and present findings from enquiries, including conclusions and explanations of results. They can present results in oral and written forms such as displays and other presentations. They can identify scientific evidence that has been used to support or refute ideas or arguments.	A Year 6 child working at the expected standard can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. They can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They can record data and results (of increasing complexity) using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. They can use test results to make predictions to set up further comparative and fair tests. They can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results. They can present results in oral and written forms such as displays and other presentations. They can identify scientific evidence that has been used to support or refute ideas or arguments.

EYFS	KS1		LOWER KS2		UPPER KS2	
sort, same, different, hear, see, smell, touch, taste, change, big(ger/est), small(er/est)	Questions, answers, equipment, explore, observe, similar, egg timers, ruler, tape measure, metre stick, beaker, collect, measures, record, group, test, compare, describe	Chart, table, pictogram, tally chart, block diagram/graph, gather, order, notice patterns, stop watch, pipette, syringe, results, differences, similarities	Scientific enquiry, observations, keys, bar chart, thermometer, data logger, changes over time, Identify, classify, evidence, conclusion, prediction, magnifying glass, microscope, comparative test, fair test, present, data, results, support, systematic, gather, evidence, rank	Increase, decrease, accurate, appearance, disprove	Opinion, fact, variables, independent variable, dependent variable, controlled variable precision, classification keys, scatter graphs, line graphs, notice relationships	Casual relationships, refute, degree of trust
Adult should also use: *Observe, question, answer, measure, compare*	***Adult should also use:*** differences, similarities, results	***Adult should also use:*** *gather, evidence, data, Venn diagram, Identify, classify, rank, notice relationships, comparatives*	***Adult should also use:*** *accurate, disprove*	***Adult should also use:*** *Notice relationships*	***Adult should also use:*** *Degree of trust, casual relationship, refute*	