Science Progression & Embedded Knowledge

Scientific enquiry types

 **Research using Secondary sources**	 **Identifying, grouping and classifying**	 **Pattern seeking**	 **Observing over time**	 **Comparative and fair testing**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS Working Scientifically	Show curiosity and ask questions. Make observations using their senses and simple equipment. Make direct comparisons. Identify, sort and group. Record their observations by drawing, taking photographs, using sorting rings or boxes or tick sheets (Rec). Talk about what they have done and found out. Use their observations to answer their questions.					
Nursery	**Our Bodies** **Animals & Habitats:** Domestic Pets **Nature & Environment**	**Nature & Environment** **Natural Phenomena:** Light & Dark	**Animals & Habitats:** Cold **Nature & Environment** **Natural Phenomena:** Freezing & Melting	**Animals & Habitats:** Hot **Natural Phenomena:** Light & Dark	**Plants & Life Cycles** **Minibeasts** **Animals & Life Cycles:** Farm Animals	**Natural Phenomena:** Forces **Animals & Habitats:** Water

Vocabulary	Head shoulder knee toes eyes ears mouth nose body see hear taste smell brush teeth wash pet family cat dog	Sort match leaves twigs conkers acorns pine cones autumn see animal home care make build sort day time night time picture	Penguin bear beak claws flippers wings fur nest mouse bird freeze ice sticks feel change melt	Wild big small pattern animals sound move picture mother baby day night sunset dusk	Grow plant seeds food minibeast hunt search find same different bird nest binoculars look listen see move sound eat eggs	Push pull vehicles fast slow further move water push blow pull make animals float sink name fish duck frog boat
Embedded knowledge	To name and point to basic body parts through rhymes/songs with actions. To learn how our body moves through rhymes/songs. To explore senses through hands on experiences. To explore how to look after their body through stories, songs and rhymes. (washing hands & brushing teeth) To share information with others about their own family pet. To name the different parts of a cat. To explore how a cat moves. To listen and talk about the different sounds a cat makes.	To take part in sensory exploration of natural resources: sorting, matching and comparing. (leaves, twigs, conkers, acorns, pine cones) To talk about what they see on an autumnal walk. To look for animal homes and hiding places. To show respect and care for the natural environment (making bird feeders, building bug hotels) To sort things into daytime or night-time boxes. (clothes, animals, sounds, events) To be able to sequence bedtime and 'getting up' routines. To create a day and night book.	To point to and name a penguin and a bear. To describe a penguin and a bear in simple terms e.g., a penguin has a beak, a bear has claws. To explore natural resources in the environment to make a nest for a mouse or bird. To explore freezing and melting in the natural habitat. To mark make in ice with sticks, observing what slowly happens to the ice – talking about feel and changes.	To observe and talk about wild animals in their natural environment – with a focus on size, patterns, animal sounds and movement. To match animal illustrations to photos of real animals. To look at the mother and baby animals in key texts. To match mums to their young with small world figures and images. To recap the difference between day and night (link back to Aut 2) To look at images of sunsets in the story and explain what is happening. To explore 'dusk' using illustrations and photographs.	To grow plants from seeds. To observe, discuss and sequence the growth of the seeds. To verbalise how to plant a seed and how to look it. To explore what foods we can get from plants. To explore different types of minibeasts. To go on a minibeast hunt and record findings. To discuss minibeast features and compare what is the same/different. To look for birds and nests with binoculars. To use simple fact files/books to identify birds. (what they look like, how they move, what sound they make, what they eat) To explore which animals hatch from eggs.	To explore how different objects move e.g., push, pull (collection of objects to test) To experiment with making objects/vehicles move faster/slower/further with ramps. (Make predictions) To explore how objects move in water. To find different ways to move a boat across water. (push, pull, blow) To explore what objects float like a boat? (making predictions) To explore how many animals can go in a boat before it sinks. (link to Mr Gumpy's outing) To name and describe a variety of water animals. To make water scenes in the small world and match with the correct water animals.

	To identify cat & dog sounds and match them to photographs. To know how to make mud. (soil and water) To make marks in mud, exploring thick and thin mud.				To compare the size and look of different eggs. To match the egg to the animal. To order the life cycle of a duck. To look after real duck eggs in class, discussing key events. To name and describe some farm animals. To match adult farm animals to their young.	
Reception	**Our Bodies** **Natural Phenomena:** Different Seasons & Weather	**Animals & Habitats:** Woodland Creatures **Natural Phenomena:** Light & Shadow	**Animals & Habitats:** Cold Creatures **Natural Phenomena:** Freezing & Melting **Forces** Floating & Sinking **Waterproofing**	**Animals & Habitats:** African Animals	**Animals & Habitats:** Minibeasts **Life Cycles:** Butterfly & Moth Sunflower **Plants**	**Animals & Habitats:** Sea Creatures **Environment** **Forces** Push and Pull
Vocabulary	head, legs, arms, feet, hands, eyes, nose, ears, mouth, belly, hair, same, different, lungs, brain, heart, grow, baby, child, adult, elderly	habitat, trees, logs, holes, leaves, bushes, hedgerows, fox, rabbit, hedgehog, squirrel, owl, mole, nocturnal, diurnal, hibernation/hibernate,	seal, penguin, polar bear, head, beak, body, flippers,tail, claws, ice, sand, forest, fish, squid, krill, Antarctica, snow, ice, iceberg, water, ice, solid,	lion, leopard, rhinoceros, elephant, African buffalo, rainforest, jungle, savannah, herbivore, carnivore, omnivore, chimpanzee, plants,	spider, ladybird, snail, bee, worm, logs, stones, grass, soil, leaves, trees, bushes, egg, caterpillar, chrysalis, butterfly, moth, antennae, wings, club-shaped, point,	shark, clown fish, sting ray, crab, orca, shell, flippers, fins, orange, white, black, pincers, recycle, rubbish, reuse, reduce, litter, save, food, breathe, medicine,

		light, shadow, day, night	liquid, wet, cold, freeze, melt, hard, slippery, heat, float, floating, sink, sinking, destiny, air	leaves, bushes, trees, fruit, meat, arms, head, body, tail, legs, trunk, ears, tusks, sand, soil, dry, damp, wet, soggy, muddy, solid, rough, smooth, lumpy	bristle, seed, shoot, root, stem, leaf, petal, sunflower, sunlight, water	move, push, pull, wind, blow, fast, slow, speed
Embedded knowledge	To talk about and describe people with a growing awareness of similarities and differences. *(Link to texts: 'My Hair' and 'Happy in Our Skin')* To verbally label parts of the human body and explain what they do, e.g., legs for standing, walking, running etc. To name some internal organs and know the job they do in simple terms. (heart, brain, lungs) To sequence the human growth timeline with pictures. *Throughout the year* To name the 4 seasons and notice the changes it makes to our natural surroundings. (Forest School)	To know what the word 'habitat' means. To name simple features of a woodland habitat. (trees, logs, holes, piles of leaves, bushes, hedgerows) To name some woodland creatures. (fox, mole, squirrel, hedgehog, rabbit, owl) To name some animals that are nocturnal and articulate why humans are not nocturnal. To understand what hibernations needs and why some animals hibernate. To name some light sources. To know where light comes from in the day and at night. To investigate shadows in natural and artificial light.	To name 3 animals that live in colder climates. To identify the key characteristics of the animals – what they look like/how they move. To know some simple facts about penguins. (features, diet, habitat etc) To describe a penguin's habitat in Antarctica and know what they need to survive. To explore water - freezing and melting, explaining what we can see happening and why.	To name the 'Big 5' African animals. (lion, leopard, rhinoceros, elephant, African buffalo) To describe habitats for animals in hotter climates and know what they need to survive. To know some simple facts about elephants and chimpanzees. (features, diet, habitat etc)	To name and describe 5 minibeasts. To describe habitats for minibeasts. To explain the simple differences between butterflies and moths. To sequence the life cycle of a butterfly and a moth. To sequence the growth of a sunflower. To label the parts of a plant. (seed, root, stem, leaf, petal) To know what a plant needs to grow. (sunlight, soil, water)	To name and describe 5 ocean animals. To recall some simple facts about ocean animals. (shark, orca, clownfish, crab, turtle, stingray) To explain in simple terms how and why we should look after our oceans. (link to World Oceans Day) To explain what recycling means and take part in this process in the classroom To explore and describe different ways of moving vehicles – push, pull, blow To explore and describe ways to change the speed or direction or distance travelled of vehicles.

		To understand what the terms 'float' and 'sink' mean. To test and make predictions for which materials/objects float or sink. To understand what waterproof means and to test whether materials are waterproof.				
KS1 Working Scientifically	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment Performing simple tests. Identifying and classifying. Gathering and recording data to help in answering questions. Using their observations and ideas to suggest answers to questions.					
KS1 Cycle A	**Living Things and their habitats**		**Animals including humans**	**Plants**		**Everyday Materials**
Vocabulary	living, non-living, dead, never alive, habitat, microhabitat, shelter, coast, pond, urban, woodland, ocean, tropical rainforest, arctic, desert, producer, consumer, predator, prey, herbivore, carnivore, omnivore, food chain		survive, air, oxygen, healthy, nutrition, vitamins, life-cycle, shelter, hygiene, lifestyle, food groups, protein, carbohydrates, fats, dairy, healthy, nutrition	bean, seed, bulb, observe, compare, conditions, light, suitable temperature, water, germinate, growth, healthy, nutrients, seed coat, root, shoot, stem, measure		materials, properties, soft, hard, rough, smooth, stretchy, stiff, shiny, dull, flexible, waterproof, absorbent, opaque, transparent, translucent, squash, bend, twist, stretch
Embedded knowledge	To explore and compare the differences between things that are living, non-living and things that have never been alive. To understand how different habitats provide		To name and group animals and their offspring. To find out how animals including humans change as they grow into adults.	To observe the germination and growth of a bean. 		To explain how materials are suitable for different uses. 

	for the needs of living things.  To 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. To know that there are different habitats and understand how they provide for the needs of living things. To describe how animals get their food from plants and other animals.		To describe what animals including humans need to survive. To name the five food groups and explain why a balanced diet is important. To describe the importance of hygiene for humans. To describe the importance of exercise for humans.	To investigate what a seed or bean needs to germinate. To explain what a seed or bean needs to germinate and grow healthily. To observe and describe how bulbs and seeds grow into mature plants.		To investigate the most suitable material for a waterproof boat. To discover how some objects change shape.
KS1 Cycle B	**Animals including humans**		**Everyday Materials**		**Animals including humans**	**Plants** **Seasonal Changes**
Vocabulary	human body, head, neck, hand, arm, leg, feet, toes, fingers, senses, smell, hear, sight, taste, touch		materials, properties, soft, hard, rough, smooth, stretchy, stiff, shiny, dull, flexible, waterproof, absorbent, opaque, transparent		animals, fish, amphibians, reptiles, birds, mammals, diet, carnivore, omnivore, herbivore	plants, wild flowers, garden plants, deciduous, evergreen, roots, stem, leaf, flower, petal, bud seasons, Autumn, Winter, Spring, Summer, weather, temperature
Embedded knowledge	To learn about the human body. To identify the main parts of the human body. To identify the five main senses.		To distinguish between an object and the material from which it is made. To identify materials in our classroom.		To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.	To identify and name a variety of common, wild and garden plants including deciduous and evergreen trees. To know about common plants and plant structure.

	 To explore the five main senses.		To identify the simple properties of everyday objects. To identify the simple physical properties of a variety of everyday objects. To describe the properties of objects.  To investigate which material is the most absorbent.		 To classify a variety of common animals from different animal groups. To identify and sort animals according to their diet.	To name and describe the four seasons and observe changes across them. To observe the different weather associated with the seasons and the varied day lengths.
LKS2 Working Scientifically	Asking relevant questions and using different types of scientific enquiries to answer them. Using straightforward scientific evidence to answer questions or to support their findings. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Setting up simple practical enquiries, comparative and fair tests. 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. Identifying differences, similarities or changes related to simple scientific ideas and processes. 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.					
Year 3	**Rocks**	**Light**	**Forces**	**Animals including humans**	**Plants**	
Vocabulary	Properties, Igneous, Sedimentary, Metamorphic, permeable, impermeable, porous, fossils, formation, decay, Scientist, organic matter.	Light source, transparent, translucent, opaque, reflect, formation, shadows, patterns.	Friction, contact, buoyancy, gravity, poles, attract, repel, magnetic.	nutrition, carbohydrates, fats and oils, protein, dairy, fruit, vegetables, diet, health, food groups, skeleton, muscles, support, protection, movement, skull, rib cage	Roots, stem, trunk, leaves, flowers, oxygen, air, carbon dioxide, light, water, nutrients, soil, transportation, flowering, life cycle, seed dispersal, seed formation, pollination, pollinators.	

Embedded knowledge	To know how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. To understand how different types of rocks are formed (Igneous, sedimentary, metamorphic) To know the terms permeable and impermeable and investigate permeability.  To know how fossils are formed. To learn about Mary Anning and the importance of her discoveries.  To know that soils are made from rocks and organic matter.	To identify sources of light. To know that light is needed in order to see things and that dark is the absence of light. To identify and classify items which are transparent, translucent or opaque. To know that light is reflected from surfaces. To recognise that light from the sun can be dangerous. To investigate how shadows are formed and find patterns in the way that the size of shadows changes. 	To observe and compare how things move on different surfaces. (Friction) To notice that some forces need contact between two objects but others do not. (gravity, buoyancy). X2 lessons To describe magnets as having 2 poles and predict whether 2 magnets will attract or repel each other. To compare and group a variety of everyday materials on the basis of whether they are magnetic and identify some magnetic materials.  To observe how magnets attract/repel each other and attract some other materials and not others through observation.	To identify that humans need the right types and amount of nutrition. To know that animals and humans cannot make their own food; they get nutrition from what they eat. To identify that humans and some other animals have skeletons for support, movement and protection. To identify that humans and some other animals for movement.	To identify the parts of different flowering plants. To describe the functions of parts of different flowering plants. To explore the requirements of plants for life and growth and how they vary plant to plant.  To investigate the way in which water is transported within plants.  To explore the part that flowers play in the life cycle of a flowering plant. To identify the different ways in which seeds can be dispersed and formed. To understand the process of pollination.
Year 4	**States Of Matter**	**Animals including Humans**	**Electricity**	**Sound**	**Living things and their habitats**
Vocabulary	Solid, Liquid, Gas State of matter	incisors canine	circuit buzzer	pitch volume	mammals fish

	cooling heating Evaporation Condensation water cycle precipitation collection	premolars molars mouth, oesophagus, stomach, small & large intestine enzyme omnivore, carnivore, herbivore producer, prey, predator	bulb motor switch battery conductor insulator	vibration / vibrate air particles loud/quiet note (high / low) (long / short) distance travel	birds amphibians reptile arachnids invertebrates / vertebrates classification similarities / differences living things / creatures species environment change
Embedded knowledge	To identify and compare the different states of matter (Solid, liquid, gas). To group materials together, according to whether they are solids, liquids or gases. To plan an investigation on how materials change state when they are heated or cooled. To conduct and observe that some materials change state when they are heated or cooled, and measure or research temperature at which this happen in degrees Celsius (°C) To identify the process of the water cycle. To identify the part played by evaporation and	To identify the different types of teeth in humans and their simple functions. To investigate the impact of different liquids on teeth.  To identify the basic parts of the digestive system in humans. To perform and explore the simple function of the basic parts of the digestive systems in humans. To construct and interpret food chains, identifying producers, predators and prey.	To know that electricity can be dangerous and identify ways to stay safe. To identify and classify common appliances which run on electricity. To construct a simple circuit, naming the basic parts, including cells, wires, bulbs, switches and buzzers. To identify whether a lamp will light in a simple series circuit and recognise that a switch opens and closes the circuit. To identify some common conductors and insulators and find similarities. 	To identify how sounds are made, associating them with something vibrating. To recognise that vibrations travel through a medium in the ear. To investigate patterns between the pitch of a sound and features of the object that produced it.  To research patterns between the volume of a sound and the strength of the vibrations that produced it. To discover and recognise that sounds get fainter as	To explore the differences between invertebrates vs vertebrates. To recognise and explore that living things can be grouped in different ways (mammals, birds, fish, arachnid, reptiles, amphibians, insects, plants/trees) To research different living things and their habitats.  To explore classification keys. To use classification keys to help group, identify and name a variety of living things in their local and wider environment. To recognise that environments can change and that this sometimes pose dangers to living things

	condensation in the water cycle and associate the rate of evaporation with temperature. 			the distance from the sound source increase.	
UKS2 Working Scientifically	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Using test results to make predictions to set up further comparative and fair tests. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Identifying scientific evidence that has been used to support or refute ideas or arguments. 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.				
Year 5	**Earth & Space**		**Living Things & their Habitats**	**Properties of Materials**	**Forces**	**Animals including Humans**
Vocabulary	Sun Earth Spherical Rotate Axis Moon Shadow Full Wax Wane Crescent Quarter Geocentric Heliocentric Orbit Rotate		life cycle reproduction offspring pollination fertilisation sexual reproduction asexual reproduction gestation incubate metamorphosis self pollination cross pollination	properties hardness solubility transparency conductivity (electrical and thermal) magnets solute solution dissolve reversible irreversible liquid solid gas separate	balanced unbalanced uneven gravity friction force water resistance air resistance magnetic force electrical force mechanics lever pulley gear newton (N) weight (N) mass (g, kg) upthrust	Fertilised egg Foetus New born baby Adolescent Adult Toddler Human development Puberty Gestation Fertilisation Periods Menstruation Life cycle of humans Menopause Old age Sperm

					reaction force	

Embedded knowledge	To compare the earth, sun and moon as approximately spherical bodies. Describe the movement of the moon relative to the earth To know the 8 planets in our solar system, the rocky planets and gas giants, identifying those with moons. To compare the distance between planets in our solar system. . To describe the movement of the earth and other planets, relative to the sun in the solar system (geocentric vs heliocentric).  To know and demonstrate how night and day are created. Use the ideas of the Earth's rotation to explain that day and night and the apparent movement of the sun across the sky. To know how the Earth's tilt of the axis and revolution affects the seasons.		To know the reproduction parts of a flower. To describe pollination and fertilisation. To understand the function of a bird's egg.  To compare the life cycles of mammals and birds. To compare the lifestyle of insects and amphibians. To make predictions of gestation periods.  	To compare and group materials on the basis of their properties, inc luding hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. To identify thermal conductors and insulators.   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, gases to decide how mixtures might be separated, including through  	To understand balanced and unbalanced forces To understand that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. To identify the effects of air resistance and water resistance & air resistance investigation.  To understand that friction acts between moving surfaces Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.  	Describe changes as humans develop from birth to old age: To identify patterns in gestation periods.  To identify and understand changes to the human body during puberty. To describe changes as humans develop into old age.

				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.  filtering, sieving and evaporating.		

Year 6	Evolution and Inheritance	Animals including humans	Living things and their habitats	Light	Electricity	
Vocabulary	Offspring Characteristics Acquired Similar Identical variation Inherited Features Maternal Paternal Genetic code DNA Charles darwin Adaptation Species Habitat Survive environment Fossil Fossil record Palaeontologist Trace fossil Body fossill	Circulatory System Heart Blood Vessels Exercise Nutrients Oxygenated Deoxygenated Cells Plasma Platelets	Classification Groups Domain Kingdom Class Order Family Species Characteristics	Reflect Refract Shadows Light Source Straight lines Concave Convex	Circuit Symbol Diagram Cell Battery Bulb Motor Switch Voltage	
Embedded knowledge	To explore why we are similar but not identical.  To identify inherited and acquired characteristics.	Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood. Describe the ways in which nutrients and water are transported in the blood	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.	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.	Associate the brightness of a lamp or the volume of a buzzer with the number of voltage cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of	

	 To explore how offspring are similar but not identical to each other. To investigate what fossils can tell us about the past. To describe adaptations in a range of animals. To consider the impact of a change in environment. To plan an investigation. To carry out an investigation. To present data. To analyse results and evaluate investigation. To demonstrate what is known as 'survival of the fittest'. To explain 'survival of the fittest'.	within animals, including humans. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. To carry out an investigation into the effect exercise has on pulse rate 	Give reasons for classifying plants and animals based on specific characteristics. To explore alternate ways to classify animals e.g. the Linnean System	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 To investigate the effect of distance on shadows 	buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram. To investigate the effect different components have on a circuit