Science Skills Progression

Working Scientifically		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
	Asking Questions	Understanding the World **3-4years** UW7 Use all of their sences in hands on exploration of natural materials UW9 talk about what they see, using a wide vocabulary UW12 explore how things work Reception UW24Draw information from a simple map UW 28 explore the natural world around them UW 29 describe what they see, hear and feel whilst outside **Early Learning Goal** - 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 the changes states of matter. <u>Other areas of learning</u> Numerous links to communication and language. **ELG Listening, attention and understanding** Respond to what they have heard by asking relevant questions. Make comments about what they have heard and ask questions to clarify understanding. **ELG Speaking** Participate in small group, class discussions offering their own ideas using recently introduced vocabulary. Offer explanation for why things might happen.	**Ask simple questions about the world around them.** With support, decide which questions can be answered practically and which cannot.	**Explore the world around them and begin to raise their own questions.** **Respond to questions, recognising different ways they might answer scientific questions.** Ask people questions and use simple secondary sources to find answers.	**Ask relevant questions about what they have observed in the world around them using some scientific vocabulary.** **Respond to questions appropriately, using scientific evidence such as data collected when relevant.** Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.	**Ask relevant questions about what they have observed in the world around them and suggest scientific enquiries to answer them and use evidence to respond to questions appropriately.** Given a range of scientific experiences including different types of science enquiries to answer questions.	**Begin to ask pertinent questions and suggest reasons for similarities and differences.**	**Ask relevant questions that use scientific evidence as a starting point to explore a concept.**
	Measuring		Experience different types of science enquiries, including practical activities. With support, perform simple tests Use senses to make observations. With support, choose appropriate equipment to make observations. Follow simple instructions for using equipment correctly and safely.	Perform simple tests. **Make simple predictions.** **Carry out simple tests using basic equipment, including measurements.** Follow simple instructions for using equipment correctly and safely. (Independently or with support). Use simple measurements and equipment to gather data.	Set up simple practical enquiries, comparative and fair tests. **Make simple predictions, explaining reasoning.** **Carry out simple tests using equipment, including comparative test, to answer questions posed to them.** Recognise when a simple fair test is necessary and help to decide how to set it up. Take accurate measurements using standard units.	Use different types of scientific enquiries to answer own questions. **Make predictions and reflect using findings.** **Carry out simple tests using equipment, including comparative test & fair tests, to answer questions posed to them.**	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions. Recognise when and how to set up comparative and fair tests, recognising and controlling variables where necessary. **Use a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**	Plan different types of scientific enquiries to answer their own questions. Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. **Use a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**
	Observing		**Make simple observations using basic equipment.** Use simple features to compare, and with help decide how to sort and group them.	Use simple features to compare, and, with help, decide how to sort and group them. (Identifying and classifying) Make relevant observations over time. Begin to use basic equipment for measuring length/ mass in standard units.	Make careful observations. Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.	Make systematic and careful observations using a range of equipment.	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary and risk identification.**
	Recording data		**Draw and label a simple diagram to show an understanding of what has been observed.** **Using their observations to create a simple model.** **Use simple tables and tallies as a way of recording scientific data.**	**Gather and record data to answer questions.** **Draw and label diagrams to show an understanding of what has been observed.** **Use their observations to create accurate models.** Use drawing and labels, prepared simple tables to present observations.	Collect and record data from their own observations and measurements in a variety of ways. **Identify and classify using more than one criteria e.g. use of Carroll diagram/Venn Diagrams.** **Gather and record simple data in a systematic manner, including accurate measurements, to draw simple conclusions from.**	**Make decisions as to how to gather and record simple data in a systematic manner, including accurate measurements, to draw simple conclusions.** **Identify and classify using more than one criteria.**	**Recording data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs.**	**Selecting a method of recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**

Science Skills Progression

			Y1	Y2	Y3	Y4	Y5	Y6
Working Scientifically	Interpret and communicate results		**With support, use simple and appropriate scientific language when talking about the topic being covered.** With support talk about what they found out and how. With support, talk about simple patterns and relationships in results.	**Use simple scientific language to describe observations.** Suggest answers to simple question (making comparisons where appropriate) Begin to notice simple patterns and relationships in results. **Identify and classify using own suggested simple criteria.**	**Report on finding from enquires, including oral and written presentations, model making to represent a concept, labelled diagrams and bar charts/tables.**	**Report on finding from enquires, including oral presentations, model making to represent a concept, labelled diagrams and bar charts/tables.** **Use appropriate scientific vocabulary to describe occurring patterns and relationships made during observations in written form, including presentation of findings/results and reasonable conclusion.**	**Using test results to make predictions to set up further comparative and fair tests.** **Reporting and presenting findings from enquiries, including conclusions and explanations in oral and written forms such as model making, displays and other presentations.**	**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.**
	Evaluation		With support, talk about some of the difficulties they encountered.	Talk about some of the difficulties they encountered. Suggest how this might be avoided. Use observations and ideas to suggest answers to questions.	Use results to draw simple conclusions, make predictions and suggest improvements.	Use straightforward scientific evidence to answer questions or to support questions or to support their findings. **Recognise when a secondary source might aid exploring a concept and explain reasons why practical aspects are not sufficient.**	Explain degree of trust in results.	**Identifying scientific evidence that has been used to support or refute ideas or arguments.**
	Vocabulary	What can we see, what we think might happen, questions, observe , similarities, differences aim, why things happen, test, questions, what have we found out, observe , similarities, differences, equipment	Investigation, enquiry, aim, questions, predict, equipment, sort, explore, what we can see or observe, similar, what we have found out	Observation, findings, chart, tables, pictogram, tally chart, block diagram/graph	Question, prediction, similarities, differences, observations, keys, bar charts, thermometer, data logger, equipment, apparatus, method, results, conclusion, patterns	Hypothesis, increase, decrease, accurate, appearance	Opinion, fact, independent variables, dependent variables, fair test	Fair test (controlled variables), procedure (diagram), systematic
Leading towards KS3		Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate Make predictions using scientific knowledge and understanding Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety Evaluate the reliability of methods and suggest possible improvements Evaluate risks Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility. Apply sampling techniques Apply mathematical concepts and calculate results Use and derive simple equations and carry out appropriate calculations Undertake basic data analysis including simple statistical techniques Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature Make and record observations and measurements using a range of methods for different investigations Present observations and data using appropriate methods, including tables and graphs Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions Present reasoned explanations, including explaining data in relation to predictions and hypotheses Evaluate data, showing awareness of potential sources of random and systematic error Identify further questions arising from their results						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Biology	**Plants**	Understanding the World **0-3 years** UW4 explore and respond to different natural phenomena **3-4 years** UW13 plant seeds and care for growing plants UW14 understand the key features of the life cycle of a plant and an animal UW15begin to understand the need for respect and care for the natural environment and all living things **Reception** UW28 explore the natural world around them UW30 recognise some environments that are different to the one in which they life UW31 understand the effect of changing season on the natural world around them. **Early Learning Goal** - 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 the changes states of matter. ..... Class experience: Know that a plant is a living thing. Look closely at different plants examining the different parts (stem, leaf, root). Plant seeds and observe germination and grow. Know that plant needs water and sunshine to grow. Collect fruit/vegetables form plant and know that some plants give us food.	**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.** (look at how they differ from plant to plant)	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**. (look at how these can differ from plant to plant)	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.** P5 Know that plants make their own food			
	Vocabulary	Plant, stem, leaf, petal, root, grow, water, sunlight, seed, fruit, vegetable,	Trees, deciduous tree, evergreen branches, bud, bulb, soil, blossom, petals, leaves, petal, root, seed, stem, trunk, bark, wild, plants, fruit, berry vegetables, names of local garden/flowering plants and tree, common names of flowers, germination, grow, water, oxygen, sun light, seeds, bulbs, suitable temperature		Air, light, soil, nutrients, reproduction, transportation, photosynthesis, pollen, insect/ wind pollination, seed formation, seed dispersal (wind, animal, water) lower, roots, stem/trunk, anther, stigma			
	Leading towards KS3	Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Biology	**Animals including humans**	Understanding the World **0-3 y** UW6 notice the differences between people **3-4 years** UW10 begin to make sence of their own life story UW15 begin to understand the need for respect and care for the natural environment and all living things **Reception** UW28 explore the natural world around them UW31 understand the effect of changing season on the natural world around them ELG 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 the changes states of matter. ..... Class experience: What our body looks like. Observing our self. Main parts of the human body. How we make sense of the world - senses	**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). (Look at different structures such as wing/tail and coverings feathers/scales) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Notice that animals, including humans, have offspring which grow into adults (e.g adults have live babies but insects lay eggs and that some do not look like their parents e.g. tadpoles) **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.	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 **Name foods from the different food groups e.g. protein, carbohydrates, sugars/fats** Identify that humans and some animals have skeletons and muscles for support, protection and movement.	**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.	**Describe the changes as humans develop to old age.**	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.
	Vocabulary	Head, stomach, back, legs, arms, skin, hair, eyes, nose, mouth, tongue, teeth, hear, see, smell, taste, touch	Names of common fish, reptiles, mammals, birds, amphibians, herbivores, omnivores, carnivores, wings, beak, fur, feathers, scales, skin, claws, paws, tail, hooves, fin etc human, legs, arms, elbow, head, ear, face, hair, head, knees, legs, nose, back, feet, chest, fingers, wrist, elbow, mouth, teeth, senses, skin-touch, eyes-see, sight, tongue, mouth-taste	Growth, reproduction, offspring, life-cycle, Young/old stages (kitten/cat, tadpole/frog, baby/child/ adult, caterpillar/butterfly etc) exercise, fitness, hygiene, healthy, unhealthy, disease, germs, survival, water, air, food, (meat, fish, vegetables, bread)	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	Foetus, embryo, womb, gestation, baby, toddler, teenager, elderly, growth, development, puberty, classification, precision, reproduction, obese	Heart, pulse, rate, pumps, blood, blood vessels, chambers, capillaries, arteries, veins, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle
	Leading towards KS3	Cell structure and organisation (plant and animal) Skeletal and muscular systems (biomechanics) Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. The structure and functions of the gas exchange system in humans, including adaptations to function. The mechanism of breathing to move air in and out of the lungs. The impact of exercise, asthma and smoking on the human gas exchange system. Cellular respiration						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Biology	**Living Things and their Habitat**	Understanding the World **0-3y** UW4 explore and respond to natural phenomena in setting and on school trip **3-4y** UW13 plant seeds and care for growing plants UW14 understand the key features of the life cycle of a plant and an animal UW15 begin to understand the need for respect and care for the natural environment and all living things UW19 know that there are different countries in the world and talk about the differences they have experienced/ seen in photographs **Reception** UW28 explore the natural world around them UW30 recognise some environments that are different to the one in which they life UW31 understand the effect of changing season on the natural world around them ELG 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 the changes states of matter. ..... Class experience: Explore their local environment and look at the different animals they can find. They look closely at their features such; as number of legs, wings, colour. They look at simple life cycles of animals such as frogs and butterflies. They look at different animals that can be found in different parts of the world such as polar bears in the Arctic and kangaroos in Australia.		**Explore and compare the differences between things that are living, dead, and things that have never been alive** Identify that most living things live in habitats to which they are suited Describe how 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 microhabitats (e.g., a woodland has many: decaying leaf litter, under a log, bark. Conditions here differ such as light/ dark, dry/damp and affect which animals live there) Describe how animals obtain their food from plants and other animals Understand a simple food chain and identify and name different sources of food. (Read, explain and create a simple food chain)		Recognise that living things (including those in the locality) can be grouped in a variety of ways Explore and use classification keys to help group, **identify and name a variety of living things in their local and wider environment**. (learn about 5 different groups of animals - fish, amphibians, reptiles, bird, and mammals. Introduce dichotomous classification keys. Create a simple key based on what can be found in their local environment.) **Recognise that environments can change** and that this can sometimes pose dangers to living things.	**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.	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 (introduce evolutionary taxonomy, use/ create dichotomous classification keys, investigate invertebrate in their local environment.) **Know that broad groupings such as micro-organisms, plants and animals can be sub-divided.** Give reasons for classifying plants and animals based on specific characteristics.
	Vocabulary	Minibeasts, bird, squirrel, hedgehog, fish, animal, plants, tress, grass, flowers, life cycle, egg, tadpole, caterpillar, egg, chrysalis, habitat, beck, nest,		Living, dead, alive, habitat, shelter, micro-habitat, energy, habitat, food chain, predator, prey, consumer, omnivore, carnivore, herbivore, adaptation, Names of local habitats; ocean, seashore, woodland/forest. Names of local microhabitats; in bushes, in soil.		Classification, classification keys, environment, habitat, human, fish, amphibians, reptiles, bird, and mammals impact, positive, negative, migrate, hibernate	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Vertebrates, fish, amphibians, reptiles, birds, human, reptile mammals, arthropods, invertebrates, insects, spiders, snails, worms, microorganisms, taxonomy, evolution, flowering, non-flowering
	Leading towards KS3	Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Differences between species. Cellular respiration Relationships in ecosystems						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Biology	**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.**
	Vocabulary							Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils, chromosomes, genes, natural selection, survival, sibling, palaeontologist
	Leading towards KS3	Heredity as the process by which genetic information is transmitted from one generation to the next. A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.						
	Seasonal Change	Understanding the World **0-3y** UW4 explore and respond to natural phenomena in setting and on school trip **3-4y** UW7 Use all of their sences in hands on exploration of natural materials UW8 explore collections of materials with similar or different properties UW9 talk about what they see, using a wide vocabulary UW12 explore how things work **Reception** UW28 explore the natural world around them UW 29 describe what they see, hear and feel whilst outside UW30 recognise some environments that are different to the one in which they life UW31 understand the effect of changing season on the natural world around them ELG 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 the changes states of matter. ..... Classroom experience: Talk about the change that occur throughout the year. How the leaves change. How new plants grow. How we dress differently in different weather. Explore seasonal objects and make observations over time.						
	Vocabulary	Spring, summer, autumn, winter, weather, sun, warm, leaves, plants, blossom, cold, frost, ice, snow, seasons, change, light, dark,						
	Leading towards KS3	The seasons and the Earth's tilt day length at different times of year, in different hemispheres.						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Chemistry	**Materials** **States of Matter**	Understanding the World 0-3y UW2 Explore materials with different properties UW3 Explore natural materials, indoors and outdoors UW4 Explore and respond to natural phenomena in setting and on school trip 3-4y UW7 Use all of their senses in hands on exploration of natural materials UW8 explore collections of materials with similar or different properties UW9 talk about what they see, using a wide vocabulary UW17 Talk about the differences between materials and changes they notice. Reception UW28 explore the natural world around them ELG 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 the changes states of matter. ..... Class experience: Explore a range of materials to see how they feel. Use different materials for different purposes e.g building towers from wooden blocks	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.**	**Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses** Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	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.	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. **Know and describe the effect of temperature on substances such as chocolate, butter, cream etc.**	**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** Gives reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution **Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating** 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.	
	Vocabulary	Paper, plastic, metal, wood, glass, water, hard, strong, soft, rough, smooth, bend, stretch, shiny, dull, waterproof	Material, wood, plastic, glass, water, metal, rock rubber, clay, elastic, hard, soft, bendy, rough, smooth, stretchy, stiff, shiny, dull, waterproof, not waterproof, absorbent, not absorbent, see through, non see through tears, breaks	As Y1 plus - Opaque, transparent, translucent, flexible, rigid, reflective, non reflective, Push, pull, bend, stretch, twist, squash	Rock, minerals, fossils, soils, humus, sandstone, granite, marble, pumice, crystals, absorbent, limestone, properties, permeable, impermeable, hardness, sedimentary, igneous, metamorphic, organic matter	Matter, solid, liquid, gas, evaporation, condensation, precipitation, particles, temperature, freezing/melting point, heating, Celsius, molecules, reversible, irreversible	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	
	Leading towards KS3	Particulate nature of atoms. Chemical reactions as the rearrangement of atoms, elements and compounds. The periodic table. Representing chemical reactions using formulae and using equations. Combustion, thermal decomposition, oxidation and displacement reactions. Defining acids and alkalis in terms of neutralisation reactions. The pH scale for measuring acidity/alkalinity; and indicators.						

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Physics	**Light** **Sound**	Understanding the World 0-3y UW4 explore and respond to natural phenomena in setting and on school trip 3-4y UW9 talk about what they see, using a wide vocabular UW12 explore how things work ELG 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 the changes states of matter. ..... Class experience Explore shadows on a sunny day. Understand light and dark			Recognise that they **need light in order to see things and that dark is the absence of light**. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that **shadows are formed when the light from a light source is blocked** by an opaque object. Find patterns in the way that the size of shadows change.	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.		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.**
	Vocabulary				Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		As for Year 3 - Light, plus straight lines, light rays, periscope
	Leading towards KS3	**Light** The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. **Sound** Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. Sound needs a medium to travel, the speed of sound in air, in water, in solids. Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the eardrum; sound waves are longitudinal. Auditory range of humans and animals. Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. Waves transferring information for conversion to electrical signals by microphone.						
	Forces	Understanding the World 0-3y UW4 explore and respond to natural phenomena in setting and on school trip 3-4y UW12 UW12 explore how things work UW16 ELG 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 the changes states of matter. ..... Class experience Explore magnetism and use magnets to test basic classroom objects. Test objects to see if they float/ sink			Compare how things move on different surfaces. **Name magnetic and non-magnetic materials, including non-ferrous metals.** **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.		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object **Identify the effects of air resistance, water resistance and friction, that act between moving surfaces** Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Physics	**Vocabulary**				Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole		Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	
	Leading towards KS3	Magnetic fields by plotting with compass, representation by field lines. Earth's magnetism, compass and navigation. Forces as pushes or pulls, arising from the interaction between two objects. Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Moment as the turning effect of a force. Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. Forces measured in Newtons, measurements of stretch or compression as force is changed.						
	Earth & Space	Understanding the World 0-3y UW4 explore and respond to natural phenomena in setting and on school trip 3-4y UW9 talk about what they see, using a wide vocabulary Reception UW31 understand the effect of changing season on the natural world around them ELG 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 the changes states of matter. ..... Class experience That we live on planet Earth. That the Earth is one of many planets in the solar system. Look at how people travel to space, what they need to					**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.	
	Vocabulary	Planet, solar system, moon , sun, Earth, stars, astronaut, rocket, orbit					Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets	
	Leading towards KS3	Earth and atmosphere The composition of the Earth, the structure of the Earth, the rock cycle and the formation of igneous, sedimentary and metamorphic rocks, Earth as a source of limited resources and the efficacy of recycling, the carbon cycle, the composition of the atmosphere, the production of carbon dioxide by human activity and the impact on climate. Space physics						
	Electricity	Understanding the World 3-4y UW9 talk about what they see, using a wide vocabulary UW12 explore how things work Reception UW31 understand the effect of changing season on the natural world around them ELG 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 the changes states of matter. ..... Classroom experience: Use simple household objects in role play. How somethings like ipads need to be charged and other objects need to be plugged into work.				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 **Name and draw using the correct symbols the basic parts of a circuit** Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors.		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches **Use recognised symbols when representing a simple circuit in a diagram.**

Science Skills Progression

		EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Physics	Vocabulary					Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol		Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage N.B. Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.
	Leading towards KS3	Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Differences in resistance between conducting and insulating components (quantitative). Static/ current electricity electromagnetism						