Progression of Science Skills and Vocabulary

SUSTAINABILITY OPPORTUNITIES

AQEYFS	Characteristics of effective learning	Early Learning Goals
Enquiry Skills	Show curiosity about objects, events and people Questions why things happen Engage in open-ended activity Take a risk, engage in new experiences and learn by trial and error Find ways to solve problems / find new ways to do things / test their ideas Develop ideas of grouping, sequences, cause and effect Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world Use senses to explore the world around them Make links and notice patterns in their experiences Create simple representations of events, people and objects Build up vocabulary that reflects the breadth of their experience	Choose the resources they need for their chosen activities Handle equipment and tools effectively Answer how and why questions about their experiences Make observations Develop their own narratives and explanations by connecting ideas or events Explain why some things occur and talk about changes
Knowledge and understanding of the world	Know about the similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.	

Working Scientifically	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plan	Ask simple questions and recognise that they can be answered in different ways.	Ask simple questions and recognise that they can be answered in different ways, using some scientific language.	Ask relevant questions and use different types of scientific enquiry to answer them when prompted. Set up simple and practical enquiries, comparative and fair tests.	Ask relevant questions and use different types of scientific enquiries to answer them. Set up simple, practical enquiries, comparative and fair tests.	Plan different types of scientific enquiries to answer questions, recognising and controlling variables where necessary.	Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary.
Do	Use simple equipment to observe closely. Perform simple tests. Identify and classify.	Use simple equipment to observe closely including changes over time. Perform simple comparative tests. Identify, group and classify.	Make systematic and careful observations, using simple equipment eg thermometers and using standard units where appropriate, when taking measurements.	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units using a range of equipment, including thermometers and data loggers.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision taking repeat readings when appropriate.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record	Gather and record data.	Gather and record data to help answer questions.	Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawing, labelled diagrams, keys, bar charts and tables.	Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams, keys, bar charts, and tables.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter, bar and line graphs. Use test results to make further comparative or fair tests.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Use test results to make predictions to set up further comparative and fair tests.
Review	Use their observations and ideas to suggest answers to simple questions.	Use their observations and ideas to suggest answers to simple questions noticing similarities, differences and patterns.	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Report on findings from enquiries, including oral and written explanations, of results and conclusions. Use results to draw simple conclusions, make predictions for new values, suggest improvements, to answer questions and raise further questions.	Report and present findings from enquiries, with support, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence that has been used to support or refute ideas or arguments.	Report and present 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. Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum, including ideas that have changed over time, using evidence from a range of sources. Find things out using a wide range of secondary sources of information.
Vocabulary	aim answers block diagrams changes compare comparative test data describe difference different do equipment explore findings gather group	observing over time Patterns and pattern seeking pictogram plan questions record researching review same scientific enquiry secondary sources similarity sort sorting diagrams table	accurate bar chart chart classify conclusion (What have we found out?) criteria data develop diagram evaluate evidence explanation key making a test fair method	observations practical enquiry prediction (What do you think will happen?) primary sources questioning reasoning relationships results (What happened?) secondary sources standard units What do we change, what do we keep the same, what are we measuring?	accuracy causal relationship justify line graph precision readings refute repeat readings scatter graph support variables control variable (What do we keep the same?) independent variable (What do we change?) dependent variable (What do we measure?)	

	identify (name) identifying, grouping and classifying investigate measure notice observe	tally chart test What will we do? (plan) What do you think will happen? (prediction) What happened? (results) What have we found out? (conclusion)		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals Including Humans	Pupils should be taught to: • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals; • group animals according to what they eat; • 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); • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Pupils should be taught to: • notice that animals, including humans, have offspring which grow into adults; • find out about and describe the basic needs of animals, including humans, for survival (water, food and air); • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Pupils should be taught to: • 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; • identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Pupils should be taught to: • 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.	Pupils should be taught to: • describe the changes as humans develop to old age.	Pupils should be taught to: • 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 Progression	• Names of animal groups: fish, amphibians, reptiles, birds, mammals. • Animal diets: carnivore, herbivore, omnivore. • Human and animal body parts: e.g. body, head, neck, arms, elbows, legs, knees, face, ears, eyes, nose, hair, mouth, teeth, hands, feet, tail, wings, feathers, fur, beak, fins, gills., **penis vulva** • Human senses: sight, hearing, touch, smell, taste. • Exploring senses: loud, quiet, soft, rough. • Other: human, animal, pet.	• Being born and growing: Young, offspring, live young, grow, develop, change, hatch, lay, fly, crawl, talk. • Young and adult names: e.g. lamb and sheep, kitten and cat, duckling and duck. • Life cycle stages: e.g. baby, toddler, child, teenager, adult; frogspawn, tadpole, froglet, frog. • Survival and staying healthy: basic needs, survive, food, air, exercise, diet, nutrition, healthy, balanced diet, hygiene, germs. • Food groups: fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar.	• Food groups and nutrients: fibre, fats (saturated and unsaturated), vitamins, minerals. • Skeletons and muscles: skeleton, muscles, tendons, joints, protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, vertebrate, invertebrate, endoskeleton, exoskeleton, hydrostatic skeleton. • Names of human bones: e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula. • Other: energy.	• Digestive system: digest, digestion, tongue, teeth, saliva, salivary glands, oesophagus, stomach, liver, pancreas, gall bladder, small intestine, duodenum, large intestine, rectum, anus, faeces, organ. • Types of teeth and dental care: molar, premolar, incisor, canine, wisdom teeth, tooth decay, plaque, enamel, baby (milk) teeth. • Food chains and animal diets: decomposer, food web.	• Process of reproduction: gestation, sperm, egg, cells, clone. • Changes and life cycle: embryo, foetus, uterus, prenatal, adolescence, puberty, menstruation, adulthood, menopause, life expectancy, old age, hormones, sweat. • Changing body parts: e.g. breasts, penis, larynx, ovaries, genitalia, pubic hair.	• Circulatory system: circulation, heart, pulse, heartbeat, heart rate, lungs, breathing, blood vessels, blood, pump, transported, oxygenated blood, deoxygenated blood, oxygen, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells. • Lifestyle: drug, alcohol, smoking, disease, calorie, energy input, energy output. • Other: water transportation, nutrient transportation, waste products.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living Things and Their Habitats		**Pupils should be taught to:** • 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 microhabitats; • 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.		**Pupils should be taught to:** • recognise that living things can be grouped in a variety of ways; • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; • recognise that environments can change and that this can sometimes pose dangers to living things.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.
Vocabulary Progression		• Living or dead: **living, dead, never living**, not living, alive, never been alive, healthy. • **Habitats** including **microhabitats**: **depend**, shelter, safety, **survive**, suited, space, minibeast, air. • Life processes: movement, sensitivity, growth, reproduction, nutrition, excretion, respiration. • **Food chains**: **food sources**, food, producer, consumer, predator, prey. • Names of habitats and microhabitats: e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat. Previously introduced vocabulary: senses, **carnivore, herbivore, omnivore, seed, water**, names of materials.		• Living things: **organisms**, **specimen**, species. • Grouping living things: **classification**, classification keys, classify, **characteristics**. • Names of invertebrate animals: snails and slugs, worms, spiders, insects. • Invertebrate body parts: e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs. • Environmental changes: **environment**, environmental dangers, adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, **endangered species, extinct**. Previously introduced vocabulary: carbon dioxide, **fish, bird, mammal, amphibian, reptile, skeleton, bone, vertebrate, invertebrate**, backbone, names for animal body parts, names of common plants, photosynthesis.	• **Reproduction: asexual reproduction, sexual reproduction, gestation, metamorphosis**, gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation. Previously introduced vocabulary: **life cycle, pollination**, offspring, **fertilise**, fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma, style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young.	• Classifying: Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation. • **Microorganisms: bacteria**, single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, **microscope**, decompose.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Pupils should be taught to: • 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.	Pupils should be taught to: • 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.	Pupils should be taught to: • 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.			
Vocabulary Progression	• Names of common plants: wild plant, garden plant, evergreen tree, deciduous tree, common flowering plant, weed, grass. • Name some features of plants: e.g. flower, vegetable, fruit, berry, leaf/leaves, blossom, petal, stem, trunk, branch, root, seed, bulb, soil. • Name some common types of plant: e.g. sunflower, daffodil.	• Growth of plants: germination, shoot, seed dispersal, grow, food store, life cycle, die, wilt, seedling, sapling. • Needs of plants: sunlight, nutrition, light, healthy, space, air. • Name different types of plant: e.g. bean plant, cactus. • Names of different habitats: e.g. rainforest, desert.	• Water transportation: transport, evaporation, evaporate, nutrients, absorb, anchor. • Life cycle of flowering plants: pollination (insect/wind), pollen, nectar, pollinator, seed formation, seed dispersal (animal/wind/water), reproduce, fertilisation, fertilise, stamen, anther, filament, carpel (pistil), stigma, style, ovary, ovule, sepal, carbon dioxide.			

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal Changes	Pupils should be taught to: • observe changes across the 4 seasons; • observe and describe weather associated with the seasons and how day length varies.					
Vocabulary Progression	• Seasons: spring, summer, autumn, winter, seasonal change. • Weather: e.g. sun, rain, snow, sleet, frost, ice, fog, cloud, hot/warm, cold, storm, wind, thunder, weather forecast. • Measuring weather: temperature, rainfall, wind direction, thermometer, rain gauge. • Day length: night, day, daylight.					

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Evolution and Inheritance						Pupils should be taught to: • 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.
Vocabulary Progression						• Evolution and inheritance: evolve, adaptation, inherit, natural selection, adaptive traits, inherited traits, mutations, theory of evolution, ancestors, biological parent, chromosomes, genes, Charles Darwin. • Other: selective breeding, artificial selection, breed, cross breeding, genetically modified food, cloning, DNA.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces			Forces and Magnets Pupils should be taught to: • compare how things move on different surfaces; • notice that some forces need contact between 2 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 2 poles; • predict whether 2 magnets will attract or repel each other, depending on which poles are facing.		Forces Pupils should be taught to: • 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.	
Vocabulary Progression			• How things move: move, movement, surface, distance, strength. • Types of forces: push, pull, contact force, non-contact force, friction. • Magnets: magnetic, magnetic field, magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic poles (north pole, south pole), attract, repel, compass. • Magnetic and non-magnetic materials: e.g. iron, nickel, cobalt.		• Types of forces: air resistance, water resistance, buoyancy, upthrust, Earth's gravitational pull, gravity, opposing forces, driving force. • Mechanisms: levers, pulleys, gears/cogs. • Measurements: weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow. • Other: streamlined, Earth.	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	Everyday Materials Pupils should be taught to: • 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.	Use of Everyday Materials Pupils should be taught to: • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses; • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Rocks Pupils should be taught to: • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties; • describe in simple terms how fossils are formed when things that have lived are trapped within rock; • recognise that soils are made from rocks and organic matter.	States of Matter Pupils should be taught to: • 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.	Properties and Changes of Materials Pupils should be taught to: • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets; • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution; • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic; • demonstrate that dissolving, mixing and changes of state are reversible changes; • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Vocabulary Progression	• Names of materials: wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric. • Properties of materials: hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent, sharp, stiff. • Other: object.	• Changing shape: squash, bend, twist, stretch. • Properties of materials: e.g. strong, flexible, light, hard-wearing, elastic. • Other: suitability, recycle, pollution.	• Types of rock: sedimentary rock, igneous rock, metamorphic rock. • Properties of rocks: permeable, semi-permeable, impermeable, durable. • Names of rocks: e.g. marble, chalk, granite, sandstone, slate. • Formation of rocks and fossils: natural, human-made, magma, lava, molten rock, sediment, erosion, fossilisation, layers, bone, fossil. • Soil: sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost. • Other: palaeontology.	• States of matter: solids, liquids, gases, particles. • State change: evaporate, condense, melt, freeze, heat, cool, melting point, freezing point, boiling point, water vapour. • Water cycle: precipitation, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail. • Other: atmosphere.	• Properties of materials: thermal conductor/insulator, magnetism, electrical resistance, transparency. • Mixtures and solutions: dissolving, substance, soluble, insoluble, solvent, solute, saturation, formulation, • Changes of materials: reversible change, physical change, irreversible change, chemical change, burning, new material, product. Separating: sieving, filtering, magnetic attraction evaporating	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Light			Pupils should be taught to: • 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.			Pupils should be taught to: • 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 Progression			• Light and seeing: dark, absence of light, light source, illuminate, visible, shadow, translucent, energy, block. • Light sources: e.g. candle, torch, fire, lantern, lightning. • Reflective light: reflect, reflection, surface, ray, scatter, reverse, beam, angle, mirror, moon. • Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct.			• Reflection: periscope. • Seeing light: visible spectrum, prism. • How light travels: light waves, wavelength, straight line, refraction.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound				Pupils should be taught to: • 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.		
Vocabulary Progression				• Parts of the ear: eardrum. • Making sound: vibration, vocal cords, particles. • Measuring sound: pitch, volume, amplitude, sound wave, quiet, loud, high, low, travel, distance. • Other: soundproof, absorb sound.		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth and Space					Pupils should be taught 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 Progression					• Solar system: star, planet. • Names of planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. • Shape: spherical bodies, sphere. • Movement: rotate, axis, orbit, satellite. • Theories: geocentric model, heliocentric model, astronomer. • Day length: sunrise, sunset, midday, time zone.	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity				Pupils should be taught to: • 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.		Pupils should be taught to: • 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.
Vocabulary Progression				• Electricity: mains-powered, battery-powered, mains electricity, plug, appliances, devices. • Circuits: circuit, simple series circuit, complete circuit, incomplete circuit. • Circuit parts: bulb, cell, wire, buzzer, switch, motor, battery. • Materials: electrical conductor, electrical insulator. • Other: safety.		• Flow and measure of electricity: voltage, amps, resistance, electrons, volts (V), current. • Circuits: symbol, circuit diagram, component, function, filament. • Variations: dimmer, brighter, louder, quieter. • Types of electricity: natural electricity, human-made electricity, solar panels, power station. • Other: positive, negative.