Progression Map

Essential Knowledge for a Scientist	Essential Skills for a Scientist.
• Knowledge of how to work scientifically. • Knowledge of how to set up, conduct, record and evaluate experiments of increasing detail (Plan, Do, Record, Review). • Knowledge of the world around us. • Knowledge of how things change and why. • Knowledge of different ways items can be used.	• To be able to ask questions and recognise that they can be answered in different ways. • To be able to observe closely, using equipment. • To be able to perform tests. • To be able to identify and classify. • To be able to use their observations and ideas to suggest answers to questions. • To be able to gather and record data to help in answering questions. • Plan, Do, Record, Review.

	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Working Scientifically				
Plan		Ask simple questions when prompted. Suggest ways of answering a question. Ask simple questions. Recognise that questions can be answered in different ways	Ask relevant questions when prompted. Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. Ask relevant questions. Use different types of scientific enquiries to answer their questions. Set up simple and practical enquiries, comparative and fair tests.	Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary.
Do	Explore the natural world around them.	Make relevant observations using simple equipment. Conduct simple tests, with support. Identify and classify with guidance.	Make systematic and careful observations, using simple equipment. Use standard units when taking measurements.	Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Begin to understand the need for repeat readings.

		Observe closely, using simple equipment. Perform simple tests. Identify and classify.	Make systematic and careful observations using a range of equipment, including thermometers and data loggers. Take accurate measurements using standard units, where appropriate.	Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Take repeat readings when appropriate.
Record		Gather and record data. Record and communicate their findings in a range of ways and begin to use simple scientific language. Gather and record data to help answer questions.	With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions. With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated. 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. Record findings using keys, bar charts, and tables. Suggest possible improvements or further questions to investigate.	Take and process repeat readings. Record data and results. Record data using labelled diagrams, keys, tables and charts. Use line graphs to record data. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs.
Review	Make observations on the natural world around them. Know some similarities and differences between the natural world around them and contrasting environments.	Recognise findings Use their observations and ideas to suggest answers to simple questions. Use their observations and ideas to suggest answers to simple questions.	With prompting, suggest conclusions from enquiries. Suggest how findings could be reported. Suggest possible improvements or further questions to investigate. Report on findings from enquiries, including oral and written explanations, of results and conclusions. Report on findings from enquiries using displays or presentations. Identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward	Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. With support, present findings from enquiries orally and in writing Suggest further comparative or fair tests. Report and present findings from enquiries, including conclusions and causal relationships. Report and presents findings from enquiries in oral and written forms such as displays and other presentation Report and present findings from enquiries,

			scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	including explanations of, and degree of, trust in results Identify scientific evidence that has been used to support or refute ideas or arguments. Use test results to make predictions to set up further comparative and fair tests.
Vocabulary	Explore, natural, world, observations, similarities, differences, natural world, contrast, environment.	Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar, similarities, different, differences, beaker, pipette, syringe. Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.	Previous vocab plus scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support, thermometers. Previous vocab plus enquiry types, increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.	Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute, data loggers. Previous vocab plus opinion/fact, confidently name scientific enquiry types.
Areas of Study				
Plants	ELG: The Natural World. Explore the natural world around them, making observations and drawing pictures of animals and plants.	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. 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.	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.	(See Evolution and inheritance).

Vocabulary	Explore, natural, world, observations, similarities, differences, natural world, contrast, environment, plants, leaves, roots, stem, flower, soil, flower, petal, stem, roots, soil, seeds, allotment, vegetable names, fruit names, tree names.	Names of: wild plants, garden pants, flowering plants, trees, leaf, flower, blossom, petal, fruit, berry, root, bulb, seed, trunk, branch, stem, bark, stalk, vegetable. Seeds, bulbs, water, light, growth, healthy, shoot, seedling.	Leaf, flower, blossom, petal, fruit, root, bulb, seed trunk, branch, stem, water, light, air, nutrients, soil, fertiliser, grow, healthy, transported, life cycle, pollination, seed formation, seed dispersal.	
Animals including humans	ELG: The Natural World. Explore the natural world around them, making observations and drawing pictures of animals and plants.	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). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Understand that animals, including humans, have offspring which grow into adults. Describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	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. 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. - (see also Evolution and inheritance).
Vocabulary	Explore, natural, world, observations, similarities, differences, natural world, contrast, environment, body parts, animal names, Vegetables,	Body, head, neck, arms, elbows, legs, knees, face, ears, eyes, eyebrows, eyelashes, nose, hair, mouth, teeth, tongue, feet, toes, fingers, nails, ankle, calf, thigh, hips, waist, trunk,	Nutrition, food types, carbohydrates, protein, vitamins and minerals, fat, sugar, fruits and veg, dietary fibre, water, balanced diet, skeleton, muscles, support, protection,	Circulatory system, heart, blood, blood vessels, pumps, oxygen, carbon dioxide, lungs, nutrients, water, diet, exercise, drugs, lifestyle, evolution, suited/suitable, adapted, adaptation, offspring,

	plants, flower, seed, tree, conker, leaf, pumpkin, grow, food, sunshine, pet names, zoo animal names, farm animal names, relevant features of the different animals they name/draw,	chest, shoulders, back, hands, wrist, tail, wing, claw, fin, scales, feathers, fur, beak, senses, hearing, seeing, touching, smelling, tasting, smooth, bright, dim, loud, quiet, high, low Offspring, life cycles, grow, change, adults, basic needs, water, food, air survival, exercise, food types (fruit and veg, bread, rice, pasta, milk, dairy, foods high in fat and sugar, meat, fish, eggs, beans), hygiene.	movement, names of bones, vertebrate, invertebrate Digestive system, nutrition, mouth, teeth, canine, incisor, molar, pre-molar, saliva, tongue, rip, tear, chew, grind, cut, oesophagus (gullet), stomach, small intestine, large intestine, rectum, anus, carnivore, herbivore, omnivore, producer, consumer, predator, prey, food chain.	reproduction, variation, inherit, inheritance, fossils.
Everyday materials (Y1) Uses of everyday materials (Y2) States of matter (EYFS/Y4) Properties and changes of materials (Y5	ELG: The Natural World. Understanding some important processes and changes in the natural world around them, including the seasons and changing states of matter.	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 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	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	Hard, soft, smooth, rough, water, mix, stir, walls, mud, roof, sand,	Object, material, wood, plastic, glass, metal, water, rock, brick, paper,	States of matter, solid, liquid, gas, air, oxygen, powder, granular/grain,	Y4 plus rigid, hard, soft, stretchy, flexible, waterproof, absorbent, electrical/thermal

	stone, brick, squash, squeeze, pull, push, solid, liquid, relevant material names.	fabric, elastic, foil, cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, waterproof, absorbent, tear, rough, smooth, shiny, dull, see through, not see through. Suitable/unsuitable, use, object, material, property, wood, plastic, glass, metal water, rock, fabrics, hard, soft, stretchy, flexible, waterproof, absorbent, transparent, translucent, opaque, shape, change, twist, squash, bend, stretch, roll, squeeze.	crystals, change state, ice/water/steam, water vapour, heating, cooling, temperature, degrees celsius, melt, freeze, solidify, melting point, boil, boiling point, evaporation, condensation, water cycle, precipitation, transpiration.	conductivity, melting, dissolve, solution, insoluble, solute, solvent, particle, mixture, filtering, sieving, residue, reversible/non reversible. changes, new material, burning, rusting.
Seasonal changes	ELG: The Natural World. Understand some important processes and changes in the natural world around them, including the seasons.	Observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies.		
Vocabulary	Processes, changes, natural, world, natural world, seasons, months, trees, leaves, weather, warm, cold, day, night, light, dark, Summer, Spring, Autumn, Winter, damp, dry, mist, long, short, suncream, protection.	Season, spring, summer, autumn, winter, weather, hot, warm, cool cold, sunny, cloudy, windy, rainy, snowing, hailing, sleet, frost, fog, mist, icy, rainbow, thunder, lightning, storm, light, dark, day, night.		
Living things and their habitats	ELG: The Natural World. 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.	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	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.	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 microorganisms, plants and animals. Give

		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.		reasons for classifying plants and animals based on specific characteristics. - (see also Evolution and inheritance).
Vocabulary	Environments, contrasting, natural, world, natural world, similarities, differences, habitats, lifecycles, food, nests, dens, hole. experiences, relevant words for the different environments being looked at.	Living, dead, never been alive, names of local habitats, land, woodland, meadow, name micro habitats, under log, stony path, under bushes, suited, basic needs, depend, food, food chain, shelter.	Classification keys, environment, fish, amphibians, reptiles, birds, mammals, vertebrates, invertebrates, names of them, human impact, positive, negative (impact).	Life cycle, reproduction, sexual, asexual, germination, pollination, seed formation, seed dispersal, pollen, stamen, stigma, plantlets, runners, mammal, amphibian, insect, bird, fish, reptile, eggs, live young. Organism, micro-organism, fungus, mushrooms, classification keys, environment, fish, amphibians, reptiles, birds, mammals, vertebrates, invertebrates, name some of these, arachnid, mollusc, insect, crustacean.
Rocks			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.	
Vocabulary			Rock, stone, pebble, boulder, soil, fossils, grains, crystals, texture, absorb water, let water through, marble, chalk, granite, sandstone, slate, sandy soil, clay soil, chalky soil, peat.	
Light			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	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

			and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the size of shadows change.	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, darkness, reflect, reflective, mirror, shadow, block, direction, transparent, opaque, translucent.	Light, light source, darkness, reflect, reflective, shadow, block, absorb, direction, transparent, opaque, translucent.
Forces and magnets			Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	
Vocabulary			Force, contact force, non-contact force, magnetic force, magnet, strength, bar/ring/button/horseshoe magnets, attract, repel, magnetic material, metal, iron, steel, non-magnetic, poles, north/south pole.	
Sound			Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and	

			features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.	
Vocabulary			Sound, sound source, noise, vibration, travel, solid, liquid, gas, pitch, tune, high, low, volume, loud, quiet, fainter, muffle, strength of vibrations, insulation, instrument, percussion, strings, bass, woodwind, tuned instrument.	
Electricity			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. 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. 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	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.

			and insulators, and associate metals with being good conductors.	
Vocabulary			Electricity, appliance, device, mains, plug, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, connect, connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, motor, faster/slower, conductor, insulator, metal/non-metal.	Electricity, appliance, device, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive, negative, terminal, connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, conductor, insulator, voltage, current, resistance.
Earth and space				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				Earth, planets, sun, solar system, moon, celestial body, spherical, rotation, spin, night and day, names of planets, dwarf planet, orbit, geocentric model, heliocentric model, shadow clocks, sundials, astronomical clocks.
Forces				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				Fall, Earth, gravity, weight, mass, air resistance, water resistance, friction,

				moving surfaces, mechanisms, levers, pulleys, gears, force, transfers.
Evolution and inheritcance				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				Living things, change, time, fossils, offspring, identical, parents, animals, plants, adapted/adaptation, suit, environment, evolution.