

Together, We Flourish

Kindness • Respect • Perseverance • Curiosity • Hope • Community



Science Progression Map

Substantive knowledge: the scientific content pupils know and remember: concepts, facts, vocabulary, models, processes and explanations from biology, chemistry and physics.

Disciplinary knowledge: the knowledge of how scientists work: asking questions, planning enquiries, observing over time, pattern seeking, identifying, grouping and classifying, comparative and fair testing, researching, recording, analysing evidence, drawing conclusions and evaluating reliability.

Procedural knowledge: the practical doing of science: using equipment safely and accurately, taking measurements, recording data, drawing diagrams, using keys, tables and graphs, and communicating findings. These are included mainly within the disciplinary column.

Key Scientific Concepts

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| Living Things and Life Processes | The structures, needs and processes of animals, humans, plants and microorganisms, including growth, reproduction, nutrition, respiration, classification and interdependence. |
| Human Body, Health and Development | How the human body works and changes over time, including senses, movement, nutrition, hygiene, digestion, circulation, puberty, lifestyle and wellbeing. |
| Materials and Matter | What materials are made of, how they behave, how they are chosen for uses, and how they can change through physical and chemical processes. |
| Forces and Interactions | How pushes, pulls, friction, gravity, resistance and magnetism affect objects, movement and mechanisms. |
| Energy, Light, Sound and Electricity | How energy is transferred and observed through electricity, light and sound, including circuits, shadows, reflection, vibration, pitch and volume. |
| Earth, Space and Seasons | Patterns and processes involving weather, seasonal change, day length, Earth, the Moon, planets and the wider solar system. |
| Evolution and Change Over Time | How living things, environments and materials change over time, including life cycles, fossils, adaptation, inheritance and evolution. |
| Environments, Biodiversity and Sustainability | How living things depend on habitats and ecosystems, how environments can change, and how human choices affect biodiversity, climate and the future. |
| Scientific Enquiry and Evidence | How scientific knowledge is built through questions, observation, measurement, classification, testing, research, data, interpretation, evaluation and explanation. |

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Substantive and Disciplinary Knowledge Progression

| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 1</p> <p>Autumn 1: Animals Including Humans</p> <p>Autumn 2: Seasonal Changes (Autumn and Winter)</p> <p>Spring 1: Everyday Materials</p> <p>Spring 2: Seasonal Changes (Spring and Summer)</p> <p>Summer 1: Plants</p> <p>Summer 2: Nature Protectors</p> | <ul style="list-style-type: none"> • Animals and humans: Identify and name common animals, including fish, amphibians, reptiles, birds and mammals; describe simple animal structures, diets and the basic parts of the human body linked to the senses. • Seasonal change: Observe autumn, winter, spring and summer; describe seasonal weather, day length and changes in plants, animals and the local environment across the year. • Everyday materials: Distinguish an object from the material it is made from; name common materials such as wood, plastic, glass, metal, water, rock, paper, cardboard, rubber and fabric; describe simple properties including hard, soft, waterproof, absorbent, transparent and opaque. • Plants: Identify common wild and garden plants, deciduous and evergreen trees, and the basic structure of flowering plants and trees including roots, stems, leaves, flowers, trunks, branches, seeds and bulbs. • Nature Protectors: Consolidate early knowledge of animals, plants, seasons and materials through caring for the local and wider environment; begin to understand that people can protect living things and shared places through practical choices. • Vocabulary: animal groups, carnivore, herbivore, omnivore, body parts, senses, season, weather, temperature, material, object, property, wild plant, garden plant, evergreen, deciduous, seed, bulb, root, stem, leaf, flower and habitat. | <ul style="list-style-type: none"> • Questioning: Ask simple scientific questions about animals, senses, materials, plants, seasons and the local environment and recognise that questions can be answered in different ways. • Observation: Observe closely using senses and simple equipment, including weather tools, hand lenses and simple measuring equipment where appropriate. • Classifying: Identify, name, group and sort animals, animal diets, body parts, materials, plants, leaves, weather types and seasonal features using simple observable criteria. • Testing and observing over time: Carry out simple comparative tests such as exploring senses, testing waterproof materials, measuring plant parts or comparing weather readings; observe change over time in weather, seasonal features, plant growth and material properties. • Recording and reviewing: Gather and record findings through drawings, simple tables, pictograms, labelled diagrams and oral explanations; begin to notice simple patterns and say what has been found out. |
| <p>Values links: Curiosity is fostered through sensory exploration and close observation. Respect and Kindness develop as pupils learn to care for their own bodies, living things and the school environment. Hope and Community begin through small, practical actions to look after plants, animals and shared spaces.</p> | | |

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| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 2</p> <p>Autumn 1: Living Things and Their Habitats</p> <p>Autumn 2: Animals Including Humans</p> <p>Spring 1: Uses of Everyday Materials</p> <p>Spring 2: Plants</p> <p>Summer 1: Biodiversity - Minibeasts</p> <p>Summer 2: Consolidation</p> | <ul style="list-style-type: none"> • Living things and habitats: Understand differences between living, dead and never alive; know that habitats and microhabitats provide basic needs and that plants and animals depend on each other in simple food chains. • Animals and humans: Know that animals, including humans, have offspring that grow into adults; understand basic needs for survival and the importance of exercise, balanced diet and hygiene. • Uses of everyday materials: Compare the suitability of materials for particular uses and know that some solid objects can be changed by squashing, bending, twisting and stretching. • Plants: Observe and describe how seeds and bulbs grow into mature plants; know that plants need water, light and a suitable temperature to grow and stay healthy. • Biodiversity - Minibeasts: Understand minibeasts, microhabitats, biodiversity, ecosystems, pollinators, decomposers and conservation; know that minibeasts have important roles in habitats and food chains. • Consolidation: Revisit and connect key stage 1 knowledge of animals, plants, habitats, materials, seasonal change, health and sustainability so that pupils can use vocabulary and ideas with increasing confidence. • Vocabulary: living, dead, habitat, microhabitat, food chain, producer, consumer, predator, prey, offspring, life cycle, survival, hygiene, suitability, recycle, germination, seed dispersal, biodiversity, ecosystem, conservation and decomposer. | <ul style="list-style-type: none"> • Questioning and comparison: Ask and answer questions about habitats, life cycles, materials, plant growth, healthy living and minibeast biodiversity using observations and simple secondary sources. • Observation over time: Observe habitats and microhabitats, plant growth, animal life cycles, human exercise effects, floating materials, minibeast homes and wormeries over time. • Classifying: Sort living things, animal offspring, life-cycle stages, food groups, materials, plants, microhabitats and minibeasts using observable features and simple scientific vocabulary. • Testing and pattern seeking: Carry out simple comparative tests on plant growth conditions, materials for purposes, woodlice preferences, exercise effects and minibeast microhabitats; notice patterns in habitats, growth and material behaviour. • Recording and communicating: Use tallies, simple tables, labelled drawings, pictograms, block diagrams and oral explanations to record data and suggest answers to questions. |
| <p>Values links: Respect and Kindness are developed through caring for animals, pets, plants and minibeasts. Curiosity grows through habitat exploration and material testing. Hope and Community link strongly to conservation, recycling, healthy routines and pupils seeing themselves as people who can protect living things.</p> | | |

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| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 3</p> <p>Autumn 1: Rocks</p> <p>Autumn 2: Animals Including Humans</p> <p>Spring 1: Forces and Magnets</p> <p>Spring 2: Plants</p> <p>Summer 1: Light</p> <p>Summer 2: Biodiversity - Birds</p> | <ul style="list-style-type: none"> • Rocks: Compare and group rocks by appearance and properties; understand natural and human-made rocks, fossil formation, soil composition and permeability. • Animals and humans: Know that animals, including humans, need the right types and amounts of nutrition; understand skeletons and muscles for support, protection and movement. • Forces and magnets: Understand pushes, pulls, contact and non-contact forces, friction, magnetic materials, magnet strength, attraction, repulsion and magnetic poles. • Plants: Describe functions of roots, stems, leaves and flowers; know requirements for plant growth, water transportation, pollination, seed formation and seed dispersal. • Light: Know that light is needed to see; understand darkness as absence of light, reflection, sun safety, opaque objects, shadows and patterns in shadow size. • Biodiversity - Birds: Consolidate understanding of living things, habitats, adaptation and environmental responsibility through a focused study of birds, their needs, local observation and ways people can support biodiversity. • Vocabulary: sedimentary, igneous, metamorphic, fossilisation, soil, nutrition, nutrient, skeleton, muscle, vertebrate, invertebrate, force, friction, magnetic, pole, pollination, seed dispersal, light source, reflection, opaque, translucent and shadow. | <ul style="list-style-type: none"> • Planning enquiries: Use scientific experiences to raise relevant questions and begin choosing enquiry approaches, including when a comparative or fair test is useful. • Observation and measurement: Make systematic observations of rocks, soils, plant growth, water transport, forces, magnetic effects, light and shadows; take measurements using standard units where appropriate. • Classifying and identifying: Group rocks, soils, foods, animals, skeleton types, magnetic materials, plant parts, light sources and materials by observable and tested properties. • Fair testing and pattern seeking: Investigate soil permeability, femur length and jumping, friction on surfaces, magnet strength, plant growth conditions, water transport and shadow changes while beginning to control what changes and what stays the same. • Recording and explaining: Record findings using tables, labelled diagrams, bar charts, keys and written explanations; use evidence to draw simple conclusions, notice patterns and suggest improvements. |
| <p>Values links: Curiosity is developed through deeper enquiry into rocks, bodies, forces, plants and light. Perseverance is strengthened through fair testing and improving methods. Respect grows as pupils consider the needs of plants, animals and birds. Hope and Community link to practical support for biodiversity in the school grounds and local area.</p> | | |

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| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 4</p> <p>Autumn 1: Living Things and Their Habitats</p> <p>Autumn 2: Animals Including Humans</p> <p>Spring 1: Electricity</p> <p>Spring 2: States of Matter</p> <p>Summer 1: Sound</p> <p>Summer 2: Reduce, Reuse, Recycle</p> | <ul style="list-style-type: none"> • Living things and habitats: Group living things in different ways; use classification keys; recognise that environments can change and that this can pose dangers to living things. • Animals and humans: Describe teeth and their functions, dental care, the digestive system and food chains using producers, predators and prey. • Electricity: Identify appliances, build simple series circuits, name cells, wires, bulbs, switches and buzzers, recognise complete and incomplete circuits, and identify conductors and insulators. • States of matter: Compare solids, liquids and gases; understand particles at a simple level; observe changes of state and link evaporation and condensation to the water cycle. • Sound: Know that sounds are made by vibrations, travel through a medium to the ear, and vary in pitch and volume; understand that sound gets fainter with distance. • Reduce, Reuse, Recycle: Develop sustainability knowledge of waste, recycling, carbon footprints, renewable and non-renewable energy, water waste, climate change and practical ways to reduce environmental impact. • Vocabulary: classification key, vertebrate, invertebrate, environment, digestive system, incisor, canine, molar, food chain, circuit, cell, component, conductor, insulator, solid, liquid, gas, evaporation, condensation, vibration, pitch, volume, sustainable, carbon footprint and landfill. | <ul style="list-style-type: none"> • Planning and decision-making: Ask relevant questions and make supported decisions about enquiry type, equipment, observations, measurements and ways to record data. • Classification and keys: Use and create simple classification keys, Venn and Carroll diagrams to identify vertebrates, invertebrates, teeth, appliances, materials, states of matter and environmental choices. • Careful observation and measurement: Make systematic observations of habitats, teeth models, circuits, melting, evaporation, sound levels and recycled plant containers; use thermometers, data loggers and standard units where useful. • Comparative and fair testing: Investigate tooth decay models, circuit changes, conductors and insulators, melting rates, evaporation, sound distance, sound absorption and plant growth in reused containers. • Evidence and review: Present data in tables, bar charts, keys, labelled diagrams and explanations; use straightforward evidence to draw conclusions, make predictions, raise further questions and suggest improvements. |
| <p>Values links: Respect and Kindness link to healthy choices, dental care and protecting habitats. Curiosity is developed through circuits, sound and states of matter. Perseverance is needed when building circuits and refining fair tests. Hope and Community link to reducing waste, saving resources and making responsible environmental choices together.</p> | | |

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| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 5</p> <p>Autumn 1: Properties and Changes of Materials</p> <p>Autumn 2: Forces</p> <p>Spring 1: Earth and Space</p> <p>Spring 2: Animals Including Humans</p> <p>Summer 1: Living Things and Their Habitats</p> <p>Summer 2: Changing Oceans</p> | <ul style="list-style-type: none"> • Properties and changes of materials: Compare materials by hardness, solubility, transparency, thermal and electrical conductivity and magnetism; understand dissolving, solutions, separating mixtures, reversible and irreversible changes. • Forces: Understand gravity, air resistance, water resistance, friction and how levers, pulleys and gears allow a smaller force to have a greater effect. • Earth and space: Describe the movement of Earth, the Moon and planets relative to the Sun; know that the Sun, Earth and Moon are approximately spherical; explain day and night using Earth's rotation. • Animals and humans: Describe human development from prenatal stages to old age, including gestation, birth, growth, puberty, adolescence, adulthood and changes in later life. • Living things and habitats: Compare life cycles of mammals, amphibians, insects and birds; describe sexual and asexual reproduction in plants and animals. • Changing Oceans: Understand oceans as living environments affected by human activity and climate change; develop knowledge of marine biodiversity, changing conditions, conservation and the importance of collective action. • Vocabulary: soluble, insoluble, solution, reversible, irreversible, thermal conductor, electrical conductor, gravity, air resistance, water resistance, friction, lever, pulley, gear, orbit, rotate, axis, gestation, puberty, metamorphosis, reproduction, marine biodiversity and conservation. | <ul style="list-style-type: none"> • Planning with variables: Plan different types of scientific enquiry, making decisions about what to change, measure and keep the same, and recognising variables in comparative and fair tests. • Accuracy and precision: Take increasingly accurate measurements using a range of equipment, repeat readings where useful and understand why precision improves confidence in results. • Testing and observing over time: Investigate insulation, conductivity, solubility, dissolving variables, rusting, parachutes, friction, water resistance, shadow movement, human growth data and plant or animal life cycles. • Research and secondary evidence: Use secondary sources to investigate planetary models, time zones, gestation, human development, life cycles, marine ecosystems and environmental change, recognising that not all questions can be answered by classroom tests. • Recording, interpreting and evaluating: Record increasingly complex data in tables, bar charts, line graphs, scatter graphs and scientific diagrams; identify causal relationships, evaluate reliability and use results to make predictions or plan further tests. |

Values links: Curiosity is fostered through big questions about materials, forces, space, life cycles and oceans. Perseverance is developed through precise measurement and controlled testing. Respect and Kindness support sensitive learning about human development. Hope and Community link to ocean conservation and understanding that shared action can protect living systems.

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| | Substantive knowledge progression | Disciplinary knowledge progression |
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| <p>Year 6</p> <p>Autumn 1: Living Things and Their Habitats</p> <p>Autumn 2: Animals Including Humans</p> <p>Spring 1: Light</p> <p>Spring 2: Electricity</p> <p>Summer 1: Evolution and Inheritance</p> <p>Summer 2: Changing Climate</p> | <ul style="list-style-type: none"> • Living things and habitats: Classify organisms into broad groups according to observable characteristics and similarities and differences, including microorganisms, plants and animals; understand Linnaean classification. • Animals and humans: Identify and name parts of the circulatory system; describe functions of the heart, blood vessels and blood; understand nutrient and water transport and the impact of diet, exercise, drugs and lifestyle. • Light: Explain that light travels in straight lines; use this to explain seeing, reflection, periscopes, shadows, coloured filters and the visible spectrum. • Electricity: Use recognised circuit symbols; compare and explain variations in component function including brightness, loudness and switch position; understand voltage, current and the effect of cells and components. • Evolution and inheritance: Understand fossils as evidence of life millions of years ago; know that offspring vary and are not identical to parents; explain adaptation, inherited characteristics, natural selection and how adaptation may lead to evolution. • Changing Climate: Consolidate sustainability learning through scientific understanding of climate change, greenhouse gases, human impact, evidence, consequences and hopeful responses at local and global scales. • Vocabulary: classification, Linnaean system, microorganism, bacteria, fungi, virus, circulation, heart rate, arteries, veins, capillaries, oxygenated, deoxygenated, straight line, refraction, visible spectrum, voltage, current, circuit symbol, inherited trait, adaptation, natural selection, evolution, greenhouse gas and climate change. | <ul style="list-style-type: none"> • Independent enquiry: Plan different types of scientific enquiries, selecting methods and equipment, controlling variables where necessary and choosing appropriate ways to record and analyse data. • Classification and evidence: Use and develop classification keys and complex information records; justify classification decisions using scientific knowledge and evidence. • Testing, accuracy and reliability: Investigate mould growth, yeast activity, heart rate, reflection, filters, voltage and component output; take accurate measurements, repeat readings and discuss the degree of trust in results. • Research and scientific argument: Use a wide range of secondary sources, judge usefulness and reliability, distinguish fact from opinion and explain how evidence supports or refutes scientific ideas, including evolution and climate change. • Communication and evaluation: Present findings confidently using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs; draw complex conclusions, explain causal relationships, evaluate limitations and suggest further investigations. |
| <p>Values links: Hope is central as pupils explore health, biodiversity, climate evidence and possible responses. Respect and Kindness support informed decisions about lifestyle and care for living things. Curiosity drives classification, light, electricity and evolution enquiries. Perseverance is developed through precise testing, evaluating reliability and revising ideas when evidence changes. Community widens to global responsibility.</p> | | |