Science Curriculum Progression

Purpose

This knowledge progression document has been developed to support the planning and teaching of science at Great Missenden Church of England School. It underpins a curriculum that builds secure, connected scientific knowledge over time while fostering curiosity, enthusiasm and enjoyment of science. Through carefully sequenced learning, pupils develop confidence in both their substantive knowledge and Working Scientifically skills, alongside the language and mindset needed to think and work as scientists.

Organisation of the Document

This document is organised in line with the key topics identified within the National Curriculum. Each topic is presented with clearly sequenced knowledge and corresponding vocabulary, while Working Scientifically is set out as a separate section to support the development of enquiry skills and scientific thinking over time. Together, these elements ensure clear progression across year groups and contribute to a broad and well-rounded understanding of science; Key Stage 3 content has also been considered to support long-term curriculum coherence. Where knowledge or vocabulary is taught in relation to a different topic or strand, this is indicated in brackets alongside the relevant content.

Early Years Foundation Stage

Although the Early Years Foundation Stage (EYFS) does not follow the same subject-specific topics, the essential foundational knowledge has been carefully drawn from relevant strands of learning, including Understanding the World, Personal, Social and Emotional Development (PSHE), and Communication and Language. This knowledge, along with key vocabulary, has been mapped and organised into the National Curriculum topics and strands to ensure continuity and progression from early years through to later stages of learning

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Topics

Animals including Humans

Year Group	Knowledge	Vocabulary
Preschool	• Use all their senses in hands-on exploration of natural materials. • Begin to make sense of their own life-story and family's history. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things.	egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, frog spawn, tadpole, froglet, frog, grow, change, die, names of animals and their young, fur, feathers, scales, tail, wings, beak, claws, paws, hooves, swim, walk, run, jump, fly, patterns, spots, stripes, grow, change, baby, toddler, child, adult, old person, smell, taste, touch, feel, hear, see, blind, deaf
Reception	• Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Recognise some environments that are different to the one in which they live.	names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice, hair (e.g. black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (e.g. blue, brown, green, grey), skin (e.g. black, brown, white), big/tall, small/short, bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman
Year 1	• 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).	head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group, parts of the human body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ears, tongue

	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	
Year 2	• 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. • 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. *(Y2 - Living things and their habitats)*	offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/butterfly), survive, survival, water, food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy) living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival *(Y2 - Living things and their habitats)*
Year 3	• 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.	nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine
Year 4	• 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.	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey
Year 5	• Describe the changes as humans develop to old age.	puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy

	• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. *(Y5 - Living things and their habitats)* • Describe the life process of reproduction in some plants and animals. *(Y5 - Living things and their habitats)*	life cycle, foetus, baby, child, adolescent, adult, reproduce, sexual, sperm, fertilises, egg, live young *(Y5 - Living things and their habitats)*
Year 6	• 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. • 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. *(Y6 - Living things and their habitats)* • Give reasons for classifying plants and animals based on specific characteristics. *(Y6 - Living things and their habitats)*	heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, cycle, circulatory system, diet, drugs, lifestyle
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.* *• 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.*	

Earth and Space

Year Group	Knowledge	Vocabulary
Preschool		
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	Sun, Moon, Earth, star, planet, sky, day, night, space, round, bounce, float
Year 1	• Observe changes across the four seasons. (Y1 – Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 – Seasonal changes)	light, light source, Sun, sunlight, dangerous *(Y3 - Light)*
Year 2		
Year 3		
Year 4		
Year 5	• 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.	Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit
Year 6		
KS3	• *Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between* *Earth and Moon, and between Earth and Sun (qualitative only).* • *Our Sun as a star, other stars in our galaxy, other galaxies.* • *The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.* • *The light year as a unit of astronomical distance.*	

Electricity

Year Group	Knowledge	Vocabulary
Preschool	• Explore how things work.	
Reception		
Year 1		
Year 2		
Year 3		
Year 4	• 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 with being good conductors.	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
Year 5		
Year 6	• 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.	circuit diagram, circuit symbol, voltage

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 electricity.*

Evolution and Inheritance

Year Group	Knowledge	Vocabulary
Preschool	• Begin to understand the need to respect and care for the natural environment and all living things. *(Nursery – Living things and their habitats)*	natural, plant, animal, leaves, seeds, conkers, acorns, twigs, bark, shells, feathers, pebbles, stones, same, different, pattern
Reception	• Recognise some environments that are different to the one in which they live. *(Reception – Living things and their habitats)*	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest)
Year 1		leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud *(Y1 - Plants)*
Year 2	• 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. *(Y2 - Living things and their habitats)* • Notice that animals, including humans, have offspring which grow into adults. *(Y2 - Animals, including humans)*	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling *(Y2 - Plants)* living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold (Y2 - Living things and their habitats)
Year 3	• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. *(Y3 - Rocks)* • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. *(Y3 - Plants)*	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (e.g. wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil *(Y3 - Plants)* soil, fossil, bone, flesh, minerals *(Y3 - Rocks)*
Year 4	• Recognise that environments can change and that this can sometimes pose dangers to living things. *(Y4 - Living things and their habitats)*	environment, habitat, human impact, positive, negative, migrate, hibernate *(Y4 - Living things and their habitats)* herbivore, carnivore, omnivore, producer, predator, prey *(Y4 - Animals, including humans)*

Year 5	• Describe the life process of reproduction in some plants and animals. *(Y5 -Living things and their habitats)*	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings *(Y5 - Living things and their habitats)*
Year 6	• 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.	offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution
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.*	

Forces

Year Group	Knowledge	Vocabulary
Preschool	• Explore how things work. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	object, float, sink, water, up, down, top, bottom, push, pull, magnet, spring, squash, bend, twist, stretch, turn, spin, smooth, rough, fast, slow
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow, bounce
Year 1		
Year 2	• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. *(Y2 - Uses of everyday materials)*	flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching (Y2 - Uses of everyday materials)
Year 3	• 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.	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
Year 4		

Year 5	• 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.	force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears
Year 6		
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.*	

Light

Year Group	Knowledge	Vocabulary
Preschool	• Explore how things work. • Talk about the differences in materials and changes they notice.	light, torch, bulb, lamp, spotlight, shiny, bright, brighter, brightest, Sun, shine, glow, mirror Reception Sun, sunny, light, shadow, shady, clouds, torch, see-through, not see-through, source, light source
Reception	• Describe what they see, hear and feel whilst outside.	
Year 1	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. *(Y1 - Animals, including humans)* • Describe the simple physical properties of a variety of everyday materials. *(Y1 - Materials)*	senses, see, eyes *(Y1 - Animals, including humans)* shiny, dull, see-through, not see-through *(Y1 - Materials)*
Year 2		opaque, transparent, translucent, reflective, non-reflective *(Y2 - Uses of everyday materials)*
Year 3	• 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.	light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous
Year 4		
Year 5	• 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. *(Y5 - Properties and changes of materials)*	
Year 6	• 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.	straight lines, light rays
KS3	• *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.*	

Living Things and Their Habitats

Year Group	Knowledge	Vocabulary
Preschool	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Begin to understand the need to respect and care for the natural environment and all living things.	natural, plant, animal, leaves, seeds, conkers, acorns, twigs, bark, shells, feathers, pebbles, stones, same, different, pattern plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil
Reception	• Draw information from a simple map. • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live.	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest)
Year 1	• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. *(Y1 - Plants)* • Identify and describe the basic structure of a variety of common flowering plants, including trees. *(Y1 - Plants)* • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. *(Y1 - Animals including humans)* • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. *(Y1 - Animals including humans)* • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). *(Y1 –Animals, including humans)* • Observe changes across the four seasons. *(Y1 - Seasonal change)*	names of garden and wild flowering plants in the local area *(Y1 - Plants)* head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group *(Y1 - Animals, including humans)* weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length *(Y1 - Seasonal changes)*

Year 2	• 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. • Notice that animals, including humans, have offspring which grow into adults. *(Y2 - Animals including humans)*	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-habitats studied, light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling *(Y2 - Plants)* offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, cat/kitten, caterpillar/butterfly) *(Y2 - Animals, including humans)*
Year 3	• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. *(Y3 - Plants)*	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (e.g. wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport
Year 4		classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate herbivore, carnivore, omnivore, producer, predator, prey *(Y4 - Animals, including humans)*
Year 5	• 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.	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings

Year 6	• 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 reasons for classifying plants and animals based on specific characteristics. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. *(Y6 - Evolution and inheritance)* • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. *(Y6 - Evolution and inheritance)*	vertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers
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.*	

Materials

Year Group	Knowledge	Vocabulary
Preschool	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes they notice.	mix, stir, cook, hot, oven, microwave, change, burn, melt, hard, runny, set, freeze, freezer, cold, blended, hard, soft, bendy, stiff, wobbly, wood, plastic, paper, card, fabric
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back
Year 1	• 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.	object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through
Year 2	• 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.	opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Year 3	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. *(Y3 - Rocks)* • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. *(Y3 - Rocks)* • 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. *(Y3 - Forces and magnets)*	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay) *(Y3 - Rocks)* magnetic force, magnet, attract, magnetic material, metal, iron, steel *(Y3 - Forces and magnets)*
Year 4	• 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. • Recognise some common conductors and insulators, and associate metals with being good conductors. *(Y4 - Electricity)*	solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle electrical conductor, electrical insulator, metal, non-metal *(Y4 - Electricity)*
Year 5	• 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.	thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

	• 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.	
Year 6		
KS3	• Chemical reactions as the rearrangement of atoms. • 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.	

Plants

Year Group	Knowledge	Vocabulary
Preschool	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things.	plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil, names of plants they grow
Reception	• Draw information from a simple map. (Reception – Living things and their habitats) • Explore the natural world around them. (Reception – Living things and their habitats) • Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats) • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) • Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)	tree, bush, herb, names of plants they see *(Reception - Living things and their habitats)*
Year 1	• 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.	leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area
Year 2	• Observe and describe how seeds and bulbs grow into mature plants.	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling, names of plants in local

	• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)	habitats and micro-habitats (Y2 - Living things and their habitats)
Year 3		photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport
Year 4	• Recognise that living things can be grouped in a variety of ways. *(Y4 - Living things and their habitats)* • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. *(Y4 - Living things and their habitats)* • Recognise that environments can change and that this can sometimes pose dangers to living things. *(Y4 - Living things and their habitats)*	classification, classification keys *(Y4 - Living things and their habitats)*
Year 5	• Describe the life process of reproduction in some plants and animals. *(Y5 - Living things and their habitats)*	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings *(Y5 - Living things and their habitats)*
Year 6	• 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. *(Y6 - Living things and their habitats)* • Give reasons for classifying plants and animals based on specific characteristics. *(Y6 - Living things and their habitats)*	flowering, non-flowering, mosses, ferns, conifers *(Y6 - Living things and their habitats)*
KS3	*• Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including*	

Rocks

Year Group	Knowledge	Vocabulary
Preschool	• Use all their senses in hands-on exploration of natural materials. (Nursery – Living things and their habitats) • Explore collections of materials with similar and/or different properties. (Nursery – Living things and their habitats)	natural, shells, pebbles, stones
Reception	• Explore the natural world around them. *(Reception – Living things and their habitats)* • Describe what they see, hear and feel whilst outside. *(Reception – Living things and their habitats)*	
Year 1	• Distinguish between an object and the material from which it is made. *(Y1 - Everyday materials)* • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. *(Y1 - Everyday materials)* • Describe the simple physical properties of a variety of everyday materials. *(Y1 - Everyday materials)* • Compare and group together a variety of everyday materials on the basis of their simple physical properties. *(Y1 - Everyday materials)*	object, material, rock, brick, clay, hard, soft, waterproof, absorbent, rough, smooth, shiny, dull, see-through, not see-through *(Y1 -Everyday materials)*
Year 2	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. *(Y2 - Uses of everyday materials)*	opaque, transparent, translucent, reflective, non-reflective *(Y2 - Uses of everyday materials)*
Year 3	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble,

	• 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.	chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay)
Year 4		
Year 5		
Year 6	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. *(Y6 - Evolution and inheritance)*	evolution
KS3	• The composition of the Earth. • The structure of the Earth. • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks.	

Seasonal Changes

Year Group	Knowledge	Vocabulary
Preschool	• Understand the key features of the life cycle of a plant and an animal. *(Preschool – Plants & Animals, excluding humans)*	grow, shoot, die, dead egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, frog spawn, tadpole, froglet, frog, grow, change, die, names of animals and their young
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.	spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers
Year 1	• Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length
Year 2		
Year 3	• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. *(Y3 - Light)*	
Year 4		
Year 5	• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. *(Y5 - Earth and space)*	
Year 6		
KS3	• *The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.*	

Sound

Year Group	Knowledge	Vocabulary
Preschool	• Explore how things work.	sound, noise, loud, quiet, high, low, music, bang, blow, pluck, soft, hard, fast, slow, names of instruments Reception sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar
Reception	• Describe what they see, hear and feel whilst outside.	
Year 1	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. *(Y1 - Animals, including humans)*	senses, hear, ear *(Y1 - Animals, including humans)*
Year 2		
Year 3		
Year 4	• 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.	sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, quiet, loud, insulation
Year 5		
Year 6		

KS3	*• 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 ear drum; 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.*

Working Scientifically

Overview

The Working Scientifically section outlines the progression of disciplinary knowledge across the school, from the Early Years Foundation Stage through to Key Stage 2, in line with the Working Scientifically expectations set out in the National Curriculum. The relevant National Curriculum statements are included alongside the progression of skills to support clarity and coverage. The skills identified for EYFS are drawn from Development Matters and provide the foundation for later scientific learning.

Application Across the Curriculum

These skills are developed over time and are applied across all areas of the science curriculum, rather than in isolation. Pupils are supported to ask questions, plan and carry out enquiries, observe and measure, record and present findings, and draw conclusions based on evidence. Through this, they develop an understanding of how scientific knowledge is generated and tested.

Progression and Enquiry

This progression reflects increasing levels of independence and complexity, enabling pupils to build confidence in selecting and using appropriate scientific approaches. Opportunities to engage in a range of enquiry types—including observing over time, pattern seeking, identifying and classifying, fair testing and research—ensure a broad and well-rounded experience of scientific enquiry. Some enquiry types and skills are introduced more explicitly in Key Stage 2, reflecting the increasing level of challenge and independence expected as pupils progress through the curriculum.

Asking Questions

Phase	National Curriculum statement	Skills Progression
EYFS		• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (Communication and language) • Ask questions to find out more and to check they understand what has been said to them. (Communication and language)
Key Stage 1	Asking simple questions and recognising that they can be answered in different ways	• Use a range of given question stems, such as: what; what if; why; when; who; and how; to ask questions about the objects, living things and processes they are exploring. • Construct a question based on a scenario or story the teacher has presented.
Lower Key Stage 2	Asking relevant questions and using different types of scientific enquiries to answer them	• Ask scientific enquiry questions with support • Following a scientific enquiry, ask questions stimulated by what they have just found out.
Upper Key Stage 2	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	• independently ask scientific enquiry questions

Planning an Enquiry

Phase	National Curriculum statement	Skills Progression
EYFS		
Key Stage 1		
Lower Key Stage 2	Asking relevant questions and using different types of scientific enquiries to answer them	• identify the data required to answer the scientific enquiry question • select appropriate practical equipment to gather the data • identify how to gather the data required to answer the scientific enquiry question • suggest the type of scientific enquiry they are using.
Upper Key Stage 2	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	• describe the method they would use to gather data to answer a scientific enquiry question.

Making Predictions

Phase	National Curriculum statement	Skills Progression
EYFS		
Key Stage 1		
Lower Key Stage 2	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• Use the data they have already gathered to suggest values for the next reading.
Upper Key Stage 2	Using test results to make predictions to set up further comparative and fair tests	• Use the data they have already gathered to suggest further values. • Use the scientific understanding gained from scientific enquiry to make predictions they can investigate using further comparative and fair tests.

Gathering Data

Phase	National Curriculum statement	Skills Progression
EYFS		• Use all their senses in hands-on exploration of natural materials. (Understanding the world) • Explore how things work. (Understanding the world) • Use one-handed tools and equipment. (Physical development) • Choose the right resources to carry out their own plan. For example, choosing a spade to enlarge a small hole they dug with a trowel. (Physical development) • Make comparisons between objects relating to size, length, weight and capacity. (Mathematics) • Compare quantities using language: 'more than', 'fewer than'. (Mathematics) • Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen, or one which is suggested to them. (Personal, social and emotional development) • Explore the natural world around them. (Understanding the world) • Describe what they see, hear and feel whilst outside. (Understanding the world) • Develop their small motor skills so that they can use a range of tools competently, safely and confidently. (Physical development) • Count objects, actions and sounds. (Mathematics) • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. (Communication and language)

		• Show resilience and perseverance in the face of challenge. (Personal, social and emotional development)
Key Stage 1	Observing closely, using simple equipment Performing simple tests Gathering and recording data to help in answering questions	• Talk about their observations of objects, materials and living things. • Talk about their observations when comparing objects, materials and living things. • Talk about their observations when describing changes. • When using a magnifying glass, adjust the position of the magnifying glass in order to see the enlarged image clearly. • When using a digital microscope, relate features on the enlarged view to the object. • Make direct comparisons of length and height. • Use bricks, lolly sticks etc. or paper strips to take non-standard measurements of length. • Use simple measuring equipment, such as teaspoons, pipettes, rulers, metre sticks etc.
Lower Key Stage 2	Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	• Make systematic and careful observations. • Measure time in standard units using stopwatches or timers. • Measure length in standard units using rulers, meter sticks, tape measures or trundle wheels. • Measure temperature in standard units using thermometers. • Measure capacity in standard units using syringes, beakers or measuring cylinders. • Use sensors to take measurements (e.g. light, sound, temperature).
Upper Key Stage 2	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	• Make relevant systematic and detailed observations. • Use a range of equipment to take measurements (e.g. distance, time, temperature, capacity, force) using standard units.

		• Select measuring equipment to give appropriately precise results. • Identify when a sensor can be used to gather evidence. • Take repeat readings as appropriate.

Recording Data

Phase	National Curriculum statement	Skills Progression
EYFS		• Talk about what they see, using a wide vocabulary. (Understanding the world) • Create closed shapes with continuous lines, and begin to use these shapes to represent objects. (Understanding the world) • Draw with increasing complexity and detail, such as representing a face with a circle and including details. (Understanding the world) • Connect one idea or action to another using a range of connectives. (Communication and language) • Describe events in some detail. (Communication and language)
Key Stage 1	Performing simple tests Gathering and recording data to help in answering questions Identifying and classifying	• Use a camera to take photographs or videos to record their observations. • Record their observations using drawings. • Record their observations using labelled drawings. • Record their observations or comparisons in writing. • Physically group objects, materials and living things or their images by a criterion. • Physically group objects or materials according to the data they gather (classifying). • Use data they gather to physically rank objects or materials (comparative testing). • Add their data to a prepared table or simple Venn diagram. • Add pictures to a pictogram. • Add tally marks to a tally chart and count up the total number.

		• Make a physical block graph or bar chart by using bricks, lolly sticks etc. or paper strips with which they measured lengths or heights. • Physically group objects, materials and living things or their images by a criterion. • Physically group objects or materials according to the data they gather (classifying). • Add their data to a prepared table or simple Venn diagram.
Lower Key Stage 2	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	• Record data in a simple table they construct themselves. • Record data onto a complex table provided for them. Record their measurements directly onto a bar chart with the axes and scales provided. • Record observations and information using a drawing, a labelled diagram and, in Year 4 only, a key.
Upper Key Stage 2	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	• Choose an appropriate method to record the data they will gather using experience of recording methods learnt in Key Stage 1 and Lower Key Stage 2 (e.g. photographs, videos, drawings, labelled diagrams, writing and tables). • Construct, and record data in, a complex table. • Construct, and record data in, a bar chart. • Construct, and record data in, a line graph. • Add data on to a scatter graph with the axes and scales provided. • Construct, and record data in, a key.

Presenting Data

Phase	National Curriculum statement	Skills Progression
EYFS		
Key Stage 1		
Lower Key Stage 2	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	• Present, with support, the recorded data in a different way in order to help answer the question.
Upper Key Stage 2	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	• Present the recorded data in a different way in order to help answer the question.

Drawing Conclusions

Phase	National Curriculum statement	Skills Progression
EYFS		• Make comparisons between objects relating to size, length, weight and capacity. (Mathematics) • Compare quantities using language: 'more than', 'fewer than'. (Mathematics) • Listen to and talk about selected non-fiction to develop a deep familiarity with new knowledge and vocabulary. (Communication and language) • Connect one idea or action to another using a range of connectives. (Communication and language) • Describe events in some detail. (Communication and language) • Compare length, weight and capacity. (Mathematics)
Key Stage 1	Identifying and classifying Using their observations and ideas to suggest answers to questions	• Use their observations and simple secondary sources (e.g. identification sheets) to name living things they find in the local area. • Recognise 'biggest and smallest', 'best and worst' etc. from their data. • Give an answer to their scientific enquiry question that is consistent with the data they have gathered either through observations, measurements or from research.
Lower Key Stage 2	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Identifying differences, similarities or changes related to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings	• Use their observations and simple secondary sources (e.g. identification sheets) to name living things they find in the local area. • Recognise 'biggest and smallest', 'best and worst' etc. from their data.

	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• Give an answer to their scientific enquiry question that is consistent with the data they have gathered either through observations, measurements or from research.
Upper Key Stage 2	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 Identifying scientific evidence that has been used to support or refute ideas or arguments	• Communicate their findings from practical activities. • Answer the scientific enquiry question using the data gathered. • Communicate their findings from practical activities. • Answer the scientific enquiry question using the data gathered.

Evaluating an Enquiry

Phase	National Curriculum statement	Skills Progression
EYFS		
Key Stage 1		
Lower Key Stage 2	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• Identify ways in which they adapted their method as they progressed or how they could change it to improve the data gathered. • Compare two methods for a test.
Upper Key Stage 2	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	• Evaluate the precision of their measurements. • Evaluate whether the results are trustworthy enough to answer the scientific enquiry question.