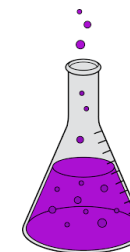


Biology, Physics, Chemistry



Early Years Curriculum - Summary Goal: Understanding the World – The Natural World

Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

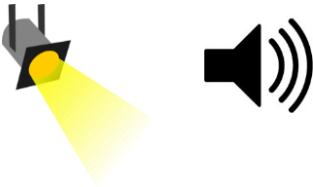
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
F1	Explore how things work. Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.	Explore and talk about different forces they can feel.	Explore collections of materials with similar and/or different properties.	Show interest in different occupations. Talk about the differences between materials and changes they notice. 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 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.	Use all their senses in hands-on exploration of natural materials. Talk about what they see, using a wide vocabulary.
F2	Talk about members of their immediate family and community Name and describe people who are familiar to them.	Recognise some similarities and differences between life in this country and life in other countries. Understand that some places are special to members of their community Recognise that people have different beliefs and celebrate special times in different ways.	Comment on images of familiar situations in the past. Compare and contrast characters from stories, including figures from the past.	Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them	Explore the natural world around them. Recognise some environments that are different from the one in which they live.	Draw information from a simple map

Year Group	Root Skills		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning) Language highlighted in red is non-negotiable language which must be displayed and understood
	Key stage 1	Year 1		
Year 1	- Experience and observe phenomena. - Examine the natural and man-made world. - Be curious and ask questions. <u>Develop their understanding of scientific ideas by:</u> 1.using scientific enquiry to answer own questions; 2.observing changes over a period of time; 3.noticing patterns; 4.grouping and classifying things; 5.carrying out simple comparative tests; 6.finding out things using secondary sources of information. Use simple scientific language to communicate their ideas to a range of audiences in a variety of ways. Learning should be carried out through first-hand practical experience and appropriate secondary sources.	- Ask simple questions and recognise they can be answered in different ways - Observe closely using simple equipment - Perform simple tests - Identify and classify data - Use observations and knowledge to suggest answers to questions - Gather and record data to help answer their question	Plants 	We are botanists! - 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
			Animals, Including Humans* (combined with Yr 2 obj) 	We are biologists! - 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. 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 body including those linked to PSHE teaching Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue - 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. Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)
			Seasonal Changes 	We are climatologists! We are meteorologists! - Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies. Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length

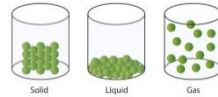
Year Group	Root Skills		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning) Language highlighted in red is non-negotiable language which must be displayed and understood
	Key stage 1	Year 2		
Year 2	- Experience and observe phenomena. - Examine the natural and man-made world. - Be curious and ask questions. <u>Develop their understanding of scientific ideas by:</u> 7.using scientific enquiry to answer own questions; 8.observing changes over a period of time; 9.noticing patterns; 10. grouping and classifying things; 11. carrying out simple comparative tests; 12. finding out things using secondary sources of information. Use simple scientific language to communicate their ideas to a range of audiences in a variety of ways. Learning should be carried out through first-hand practical experience and appropriate secondary sources.	- Ask their own questions about what they notice - Use different enquiry types to gather and record data - Use simple equipment where appropriate - Observe changes over time - notice similarities, differences and patterns - group and classify objects - Complete simple comparative tests - research using secondary sources - communicate their ideas and what they have found out in a variety of ways	Everyday Materials* (combined with Yr 1 obj) 	We are chemists! - 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 - 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 and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching
			Living Things and Habitats 	We are biologists! - 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 micro-habitats - 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 Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.
			Plants 	We are botanists! - 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. light, shade, sun, warm, cool, water, grow, healthy

Year Group	Root Skills (underlining indicates progression)		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning) Language highlighted in red is non-negotiable language which must be displayed and understood
	Lower KS2	Year 3		
Year 3	- Explore, <u>discuss</u>, <u>test</u> and <u>develop ideas</u> about everyday phenomena - Explore the relationships between living things and familiar environments. - Develop ideas about functions, relationships and interactions. <u>Develop their understanding of scientific ideas by:</u> - Ask questions about what they observe and <u>make decisions</u> about which types of scientific enquiry are likely to be the best ways of answering them; - observing changes over time, - noticing patterns, - grouping and classifying things - carrying out simple comparative and <u>fair tests</u> - finding things out using secondary sources of information.	- Ask relevant questions and use different enquiry types to answer them with support - With support set up simple practical enquiries uncluding comparative and fair tests - Make systematic and careful observations, including using standard units - Use a range of ways to gather, record and present data - Record findings using drawings, diagrams, keys, tables and complete a bar chart with a given template - Use oral and written explanations to present conclusions - Use results to draw simple conclusions with a scaffold and suggest improvements	Rocks 	We are geologists! - 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. Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil
			Plants, Living Things and their Habitats * (combined with Yr 4 obj) 	We are biologists! - 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. Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal) - 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. Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

	7. Draw <u>simple conclusions</u> and use some <u>scientific language</u>. Talk <u>and write</u> about what they have found out.	- Use results to make predictions about further investigations and raise further questions - Use scientific evidence to answer questions and support findings	Forces, Magnets and Electricity * (combined with Yr 4 obj) 	We are physicists! 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 - 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
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Year Group	Root Skills (underlining indicates progression)		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning) Language highlighted in red is non-negotiable language which must be displayed and understood
Year 4	Lower KS2	Year 4	Light and Sound* (combined with Yr 3 obj) 	We are physicists! - 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, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous - 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, loud, insulation
	- Explore, <u>discuss</u>, <u>test</u> and <u>develop ideas</u> about everyday phenomena - Explore the relationships between living things and familiar environments. - Develop ideas about functions, relationships and interactions. <u>Develop their understanding of scientific ideas by:</u> - Ask questions about what they observe and <u>make decisions</u> about which types of scientific enquiry are likely to be the best ways of answering them; - observing changes over time, - noticing patterns, - grouping and classifying things - carrying out simple comparative and <u>fair tests</u> - finding things out using secondary sources of information. - Draw <u>simple conclusions</u> and use some <u>scientific language</u>. Talk <u>and write</u> about what they have found out.	- Ask relevant questions and use different enquiry types to answer them - Set up simple practical enquiries including comparative and fair tests, identify variables to be controlled with support - Make systematic and careful observations, including using standard units with increasing accuracy - Use a range of ways to gather, record and present data - Record findings using drawings, diagrams, keys, bar charts and tables - Use oral and written explanations to present conclusions - Use results to draw simple conclusions, suggest improvements, make predictions about further investigations and raise further questions - Use scientific evidence to answer questions and support findings	Animals, including Humans* (combined with Yr 3 obj) 	We are biologists! We are zoologists! - 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, support, protect, move, skull, ribs, spine, muscles, joints - 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, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain

States of Matter



We are climatologists! We are meteorologists!

- 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 ($^{\circ}\text{C}$).
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle

Year Group	Root Skills (underlining indicates progression)		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning)
	Upper KS2	Year 5		
Year 5	- Explore and talk about ideas; - Ask own questions - Understand <u>abstract ideas</u> and <u>make predictions</u> about how the world operates. - Recognise that scientific ideas change and develop over time. Develop their <u>understanding of scientific ideas</u> by: <u>Select</u> appropriate methods to carry out scientific enquiry - Observing changes over time, noticing patterns, grouping and classifying things, carrying out <u>comparative and fair tests</u> and using a wide range of secondary sources. - Draw <u>conclusions based on data</u>. <u>Justify</u> ideas based on their knowledge and findings. <u>Work systematically</u>	- plan different types of scientific enquiries including recognising and controlling variables - take measurements using a range of scientific equipment with increasing accuracy and precision, repeating readings where appropriate - Recording data using scientific diagrams, classification keys, labelled diagrams, tables, and bar, scatter and line graphs - report results of inquiries, including conclusions, causal relationships in oral and written forms - identify scientific evidence that has been used to support or refute ideas or arguments	Properties and Changes of Materials 	Language highlighted in red is non-negotiable language which must be displayed and understood We are metallurgists! - 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. Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material
			Earth and Space 	We are astronomers! - 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. Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets

Light and Electricity *
(combined Yr 6 obj)



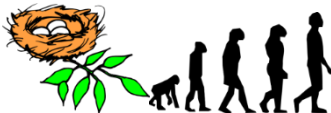
We are physicists!

- 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

- 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, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage

	Root Skills (underlining indicates progression)		Branch Knowledge *indicates two topics have been combined	Leaf Knowledge (Specific Details of Learning) Language highlighted in red is non-negotiable language which must be displayed and understood
	Upper KS2	Year 6		
Year 6	- Explore and talk about ideas; - Ask own questions - Understand abstract ideas and make predictions about how the world operates. - Recognise that scientific ideas change and develop over time. <u>Develop their understanding of scientific ideas by:</u> <u>Select</u> appropriate methods to carry out scientific enquiry - Observing changes over time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and using a wide range of secondary sources. - Draw conclusions based on data. Justify ideas based on their knowledge and findings. <u>Work systematically</u>	- Describe and evaluate their own others' scientific ideas using evidence from a range of sources - Ask their own scientific questions - Plan the most appropriate way of answering the question, controlling variables when necessary and all 5 enquiry types - Use a range of scientific equipment to take accurate and precise measurements, repeating where appropriate - Record data using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - Evaluate their investigations and suggest improvements. - Draw conclusions and raise further questions that could be investigated, based on their data and observations	Living Things and their Habitats & Evolution and Inheritance * (combined with Y5 obj) 	We are biologists! We are palaeontologists! - 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, bulbs, cuttings - Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. - Give reasons for classifying plants and animals based on specific characteristics. Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering - 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, suited, adapted, environment, inherited, species, fossils
			Animals, including Humans * (combined with Y5 obj) 	We are anatomists! We are physiologists! - Describe the changes as humans develop to old age. Puberty – the vocabulary to describe sexual characteristics - 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. Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle
			Forces (Yr 5 obj) 	We are physicists! - 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

