

Science Curriculum Overview: Bushey Heath Primary School

Our science curriculum is founded on National Curriculum knowledge requirements and allows children to showcase working scientifically skills. Through enquiry and investigation, our children are encouraged to solve real and relevant problems whilst applying their scientific understanding.

It is our intention to inspire and engage children with the wider world around them and as such, our curriculum has been extended to include a school wide STEM project each year that allows children to apply their learning to a real world problem. Science and engineering practices highlight how science is a highly social, creative and problem-solving process. Topics will range from engineering, computer science, the impact of science on their environment and also link to other curriculum areas and culminate in a whole school celebration of science and engineering.

Enquiry Types

1. Observation over time
2. Comparative and fair testing
3. Identifying and classifying
4. Pattern seeking
5. Researching using secondary sources

Early Years Foundation Stage

Understanding the World

The Natural World ELG

Children at the expected level of development will: - 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.

KS1 Concepts

Structure- Anything composed of parts arranged together in some way

Function- A specific job or procedure

Cause and effect- Cause is why something happens. Effect is what event has happened as a result of this

Changes- Changing from one material/state to another

KS2 Concepts

Structure- Anything composed of parts arranged together in some way

Function- A specific job or procedure

Variation- The presence of differences between living things of the same species

Adaptation- The process by which animals, plants and other living things have changed so that they better suit their habitat

Cause and effect- Cause is why something happens. Effect is what event has happened as a result of this

<p>Growth- The process of increasing in size</p> <p>Energy- Strength and power. There are many forms such as thermal (heat), radiant (light) or kinetic (movement)</p> <p>Process- A series of actions or steps taken in order to achieve a particular end</p> <p>Similarity and Difference- Similarity is sameness or a likeness between things and differences are a point or way in which people or things are dissimilar</p> <p>Working scientifically- The processes of science: asking questions, designing experiments, reasoning and arguing with scientific evidence and analysing and interpreting data</p>	<p>Changes- Changing from one material/state to another</p> <p>Evolution- The way that living things change over time</p> <p>Growth- The process of increasing in size</p> <p>Energy- Strength and power. There are many forms such as thermal (heat), radiant (light) or kinetic (movement)</p> <p>Process- A series of actions or steps taken in order to achieve a particular end</p> <p>Similarity and Difference- Similarity is sameness or a likeness between things and differences are a point or way in which people or things are dissimilar</p> <p>Working scientifically- The processes of science: asking questions, designing experiments, reasoning and arguing with scientific evidence and analysing and interpreting data.</p>
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KS1 Skills

Working scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

KNOWLEDGE CURRICULUM FOCUS	Autumn	Spring	Summer
Year 1	<p>Chemistry: Everyday Materials Distinguish between an object and the material from which it is made.</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday</p>	<p>Biology: Animals including humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p>Seasonal Changes (spring, summer) Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p>

	<p>materials on the basis of their simple physical properties.</p> <p>WS Task: Comparative and fair testing- Floating and sinking</p>	<p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p>WS Task: Identifying and classifying- Our class pictograms</p>	
Vocabulary	<p><i>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</i></p>	<p><i>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 • Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</i></p>	<p><i>Weather (sunny, rainy, windy, snowy etc.) • Seasons (winter, summer, spring, autumn) • Sun, sunrise, sunset, day length</i></p>
	<p>Seasonal Changes (autumn, winter) Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>WS Task: Observing over time/ pattern seeking- Investigating rain</p>	<p>Biology: Plants Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>WS Task: Observing over time- Growing Cress Identifying and classifying- Eating Plants</p>	STEM challenge
Vocabulary	<p><i>Weather (sunny, rainy, windy, snowy etc.) • Seasons (winter, summer, spring, autumn) • Sun,</i></p>	<p><i>Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch,</i></p>	

	<i>sunrise, sunset, day length</i>	<i>stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area</i>	
KNOWLEDGE CURRICULUM FOCUS	Autumn	Spring	Summer
Year 2	<p>Biology: Plants Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>WS Task: Observing over time- Observing germination</p>	<p>Biology: Animals Including Humans Notice that animals, including humans, have offspring which grow into adults.</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>WS Task: Pattern seeking- Growth and survival</p>	<p>The environment</p> <p>Climate Change To observe closely, using simple equipment by measuring the time taken for ice to melt in a comparative test.</p> <p>Reduce, Reuse, Recycle To identify and classify by sorting litter into recycling groups based on their materials.</p> <p>Energy Experts To use surveys and use the information to help answer a question.</p> <p>Forest Friends To research the rainforest.</p> <p>Water Wise To carry out a simple tests by investigating how much water can be saved by turning off the tap while washing hands.</p> <p>Endangered Animals To ask simple questions about endangered animals.</p>
<i>Vocabulary</i>	<i>As for Year 1 plus light, shade, sun, warm, cool, water, grow, healthy</i>	<i>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,</i>	

		<i>vegetables, bread, rice, pasta)</i>	
	<p>Chemistry: Uses of everyday materials Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>WS Task: Comparative and fair testing- Testing waterproofness of materials</p>	<p>Biology: Living things and their Habitats Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>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.</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</p> <p>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.</p> <p>WS Task: Observing over time/ pattern seeking- microhabitats</p>	STEM challenge
<i>Vocabulary</i>	<i>Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, nonreflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching</i>	<i>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.</i>	
LKS2 SKILLS			
<p>Working scientifically</p> <ul style="list-style-type: none"> • Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests 			

- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- 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
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes

Using straightforward scientific evidence to answer questions or to support their findings

Year 3	Autumn	Spring	Summer
	<p>Biology: Animals including humans 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.</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>WS Task: Research using secondary sources- model skeletons Researching Skeletons</p>	<p>Chemistry: Rocks Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p> <p>WS Task: Comparative and fair testing- Testing soils.</p>	<p>Physics: Light Recognise that they need light in order to see things, and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows change.</p> <p>WS Task: Comparative and fair testing- Investigating shadows and different materials.</p>
<p><i>Vocabulary</i></p>	<p><i>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine.</i></p>	<p><i>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</i></p>	<p><i>Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous.</i></p>
	<p>Physics: Forces and magnets Compare how things move on different surfaces.</p>	<p>Biology: Plants Identify and describe the functions</p>	<p>STEM Challenge</p>

	<p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>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.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>WS Task: Investigating magnets. Comparative and fair testing- Shoe Grip.</p>	<p>of different parts of flowering plants: roots; stem/trunk; leaves; and flowers.</p> <p>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>WS Task: Pattern seeking- Measuring plant growth.</p>	
<i>Vocabulary</i>	<i>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</i>	<i>Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)</i>	
Year 4	Autumn	Spring	Summer
	<p>Physics: Sound Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p>	<p>Biology: Animals including humans Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Biology: Living things and their habitats Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>

	<p>Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>WS Task: Comparative and fair testing- Changing pitch.</p>	<p>WS Task: Observing over time- Teeth- investigating the effect of different liquids on egg shells.</p>	<p>WS Task: Identifying and classifying- Classifying animals</p>
	<p><i>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation</i></p>	<p><i>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</i></p>	<p><i>Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate</i></p>
	<p>Physics: Electricity Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> <p>WS Task: Classifying- identifying conductors.</p>	<p>Chemistry: States of Matter Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>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).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>WS Task: Observing over time- solids, liquids and gases- investigating mass of liquid as bubbles escape.</p>	<p>STEM Challenge</p>
	<p><i>Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose</i></p>	<p><i>Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation,</i></p>	

	<i>connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol.</i>	<i>temperature, water cycle.</i>	
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UKS2 Skills

Working scientifically

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of 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.

Year 5	Autumn	Spring	Summer
	<p>Physics: Forces Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p> <p>WS Task: Comparative and fair testing- investigate parachutes.</p>	<p>Biology: Living Things and their habitats Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p> <p>WS Task: Pattern seeking- Gestation lengths</p>	<p>Biology: Animals including humans Describe the changes as humans develop to old age.</p>
<i>Vocabulary</i>	<i>Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears.</i>	<i>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</i>	<i>Puberty – the vocabulary to describe sexual characteristics.</i>
	<p>Chemistry: Properties and changes of materials 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.</p> <p>Know that some materials will dissolve in liquid to form a solution and describe how to recover a</p>	<p>Physics: Earth and Space Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</p> <p>Describe the movement of the Moon relative to the Earth.</p>	STEM Challenge

	<p>substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>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.</p> <p>WS Task: Comparative and fair testing- Dissolving Skittles</p>	<p>Describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.</p> <p>WS Task: Researching- Changing ideas.</p>	
<i>Vocabulary</i>	<i>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material</i>	<i>Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets</i>	
Year 6	Autumn	Spring	Summer
	<p>Biology: Evolution and inheritance</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p>Physics: Light</p> <p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>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.</p>	<p>Biology: Animals including humans</p> <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>

	WS Task: Pattern seeking- Birds and beaks.	Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. WS Task: Comparative and fair testing- Investigating shadows- distance from light source and size of shadow.	WS Task: Observing over time- investigating pulse rate.
<i>Vocabulary</i>	<i>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</i>	<i>As for Year 3 - Light, plus straight lines, light rays,</i>	<i>Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle</i>
	Biology: Living things and their habitats 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. WS Task: Identifying and classifying- Investigating respiration of yeast.	Physics: Electricity 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. WS Task: Comparative and fair testing- Changing components.	STEM Challenge
<i>Vocabulary</i>	<i>Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering.</i>	<i>Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage.</i>	

Biology	The study of living things.
Chemistry	The study of the composition and properties of substances and of the changes they undergo. (What things are made of and how they change.)
Physics	The study of matter, energy, and the interaction between them. Matter- anything that takes up space (air, water, rocks, people etc) Energy- the ability to do work.