SCIENCE at ABBEY

At Abbey, we nurture a love of learning. We open windows of opportunity by creating memorable moments. Learning with meaningful relationships supports our children to become valued members of the community. We embed the core subjects within an expansive and challenging curriculum. We develop and nurture young minds, creating memorable moments and events. We promote and celebrate equality and diversity.

Intent

At Abbey Primary School, our children will be young scientists. Our challenging yet stimulating curriculum will provide the foundation for science; a system of observations and experiments used to gain knowledge about how and why things happen the way they do by using our senses to observe the world and experiments to investigate how it works. Abbey Primary increases curiosity for the future by developing scientific enquiry skills: comparative and fair testing, observing over time, seeking patterns, identifying, classifying and grouping and the use of secondary sources. We seek to inspire their love of this fascinating subject by encouraging opportunities for life-long learning and future related careers. We are committed to learning about scientists from a diverse range of ethnical backgrounds, including those of all genders and disabilities, to encourage aspirations for all.

Implementation

We follow the Willow Learning Trust scheme of work for science from years 1 to 6. This has been developed by subject specialists across the Trust. Science is taught in units, spanning a half term, which gives children the opportunity to become immersed in a topic, deepen their knowledge and understanding, and identify their own lines of enquiry and investigation. Within Early Years, science is planned from the EYFS framework and the 2020 Development Matters: the main focus area being Understanding the World with links to Communication and Language and Personal, Social and Emotional Development. At Abbey, an ever-changing investigation area allows the children to start becoming young scientists by learning through play and exploring which is adjusted to develop the skill of creating and thinking critically.

Science is taught once a week in both KS1 and KS2. Lessons start with retrieval practice (previous lesson, previous units, previous year group learning) before completing a vocabulary task based on the SEEC model. Core knowledge, scientific skills and enquiry types are shared at the start of each lesson. A science 'hook' engages our children in their learning, engaging activities are based on a meaningful context and give our young scientists an opportunity to practice their scientific skills. Disciplinary writing – twice in a unit – ensures our children deepen their understanding and write like scientists. Each unit is outlined within the curriculum map with a corresponding progression of core knowledge and skills. Children develop their scientific enquiry through half termly investigations linked to their unit. Teachers are well-trained, have strong subject knowledge and high expectation of the children which ensures that any misconceptions are challenged and addressed.

Impact

As a result of what we are implementing, we will have a generation of young scientists whose attitudes are overwhelmingly positive and enthusiastic. They will have developed an understanding of scientific enquiry and investigation and how this links to real scientific issues that impact their everyday lives. In doing this, pupils will become assured learners willing to take risks, ask questions and carry out scientific enquiries. Assessment and monitoring activities will emphasise children's development in the knowledge and the skills summarised in the curriculum map and their capability to use the key components of scientific enquiry which will create confident and ready students for their next stage of learning.

PROGRESSION OF SUBSTANTIVE KNOWLEDGE - FACTS/WHAT							
	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Animals including humans	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.	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 common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Understand that animals, including humans, have offspring which grow into adults. Describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey	Describe the changes as humans develop to old age.	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognize the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans. - (see also Evolution and inheritance)

Living things and their habitats	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.		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		Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. - (see also Evolution and inheritance)

			identify and name different sources of food				
Plants		Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees.	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed			

				formation and seed dispersal.			
Seasonal change	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.	Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.					
Materials	Explore the natural world around them. Describe what they see, hear and feel whilst outside.	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	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,		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).	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	

		everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.	bending, twisting and stretching.		Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	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.	
Rocks				Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.			
Light (Y3 & Y6) Sound (Y4)	Describe what they see, hear and feel whilst outside.			Recognise that they need light in order to see things and that dark is the absence of light.	Identify how sounds are made, associating some of them with something vibrating.		Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to

				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.	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.		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.
Forces and magnets (Y3) Forces (Y5)	Explore the natural world around them. Describe what they see, hear and feel whilst outside.			Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance.		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	

				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.		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.	
Electricity					Identify common appliances that run on electricity. Construct a simple series		Associate the brightness of a lamp or the volume of a buzzer with the number and

					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.		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.
Earth and Space	Explore the natural world around them.					Describe the movement of the Earth, and other	

	Describe what they see, hear and feel whilst outside.					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.	
Evolution							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.
PROGRESSION OF DISCIPLINARY KNOWLEDGE – Scientific Skills							
	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Asking questions	Listen attentively and respond with relevant questions	Ask simple questions using stem sentences	Ask simple questions and recognise that they can be answered in different ways	Ask questions and understand that they are different enquiry types they could use to answer them	Ask relevant questions and use different types of scientific enquiry to answer them	Ask scientific questions and begin to understand which questions would be best suited to each inquiry type	Ask relevant scientific questions and choose which enquiry type would be best suited to answer them
Planning and predicting enquiries		Children can state what they think will happen	Children can predict the outcome of the enquiry.	Make relevant predications. Identify what they will change, observe and keep the same. With support, set up simple	Make predictions based on simple scientific knowledge. Identify what they will change, observe or measure and keep the same.	Make predictions based on scientific knowledge. With support, plan different types of scientific enquiry. Where appropriate, identify the dependent,	Make predictions based on scientific knowledge. Plan different types of scientific enquiry to answer questions, including recognizing and controlling

				practical enquiries.	Set up simple practical enquiries, comparative and fair tests.	independent and controlled variables.	variables where necessary.
Making observations		Observe closely	Observe closely using simple equipment	Make careful observations using scientific equipment	Make systematic and careful observations using scientific equipment	Use a range of scientific equipment to make systematic and careful observations	Use a range of scientific equipment to make systematic and careful observations with increased complexity
Take measurements		Carry out simple tests using non-standard measurements.		Perform tests and simple experiments and take measurements using standard units.	Take accurate measurements using standard units, using a range of equipment including thermometers.	Take accurate measurements using a range of scientific equipment. Start to take repeat readings when appropriate.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
PROGRESSION OF KEY VOCABULARY							
	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Animals including humans	names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold,	head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of	offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and	nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water,	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum,		heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, cycle, circulatory

	wet, dry, snow, ice, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman	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	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)	skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey		system, diet, drugs, lifestyle
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)		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		Classification keys, environment, fish, amphibians, reptiles, birds, mammals, vertebrates, invertebrates, names of them, human impact, positive, negative (impact)	Life cycle, reproduction, sexual, asexual, germination, pollination, seed formation, seed dispersal, pollen, stamen, stigma, plantlets, runners, mammal, amphibian, insect, bird, fish, reptile, eggs, live young	Organism, micro-organism, fungus, mushrooms, classification keys, environment, fish, amphibians, reptiles, birds, mammals, vertebrates, invertebrates, arachnid, mollusc, insect, crustacean

			micro-habitats studied				
Plants		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	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport			
Seasonal change	Season, spring, summer, autumn, winter, weather, hot, warm, cool cold, sunny, cloudy, windy, rainy, snowing, hailing, sleet, frost, fog, mist, icy, rainbow, thunder, lightning, storm, light, dark, day, night						
Materials		Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard, rubber, wool,	Suitable/unsuitable, use, object, material, property, wood, plastic, glass, metal water, rock, fabrics, hard, soft, stretchy, flexible,		States of matter, solid, liquid, gas, air, oxygen, powder, granular/grain, crystals, change state, ice/water/steam,	Y4 plus rigid, hard, soft, stretchy, flexible, waterproof, absorbent, electrical/thermal conductivity, melting, dissolve,	

		clay, hard, soft, stretchy, stiff, bendy, waterproof, absorbent, tear, rough, smooth, shiny, dull, see through, not see through	waterproof, absorbent, transparent, translucent, opaque, shape, change, twist, squash, bend, stretch, roll, squeeze		water vapour, heating, cooling, temperature, degrees Celsius, melt, freeze, solidify, melting point, boil, boiling point, evaporation, condensation, water cycle, precipitation, transpiration	solution, insoluble, solute, solvent, particle, mixture, filtering, sieving, residue, reversible/non reversible changes, new material, burning, rusting,	
Rocks				Rock, stone, pebble, boulder, soil, fossils, grains, crystals, texture, absorb water, let water through, marble, chalk, granite, sandstone, slate, sandy soil, clay soil, chalky soil, peat			
Light (Y3 & Y6) Sound (Y4)				Light, light source, darkness, reflect, reflective, mirror, shadow, block, direction, transparent,	Sound, sound source, noise, vibration, travel, solid, liquid, gas, pitch, tune, high, low, volume, loud, quiet, fainter, muffle, strength		Light, light source, darkness, reflect, reflective, shadow, block, absorb, direction, transparent,

				opaque, translucent	of vibrations, insulation, instrument, percussion, strings, bass, woodwind, tuned instrument		opaque, translucent
Forces and magnets (Y3) Forces (Y5)				Force, contact force, non-contact force, magnetic force, magnet, strength, bar/ring/button/horseshoe magnets, attract, repel, magnetic material, metal, iron, steel, non-magnetic, poles, north/south pole		Fall, Earth, gravity, weight, mass, air resistance, water resistance, friction, moving surfaces, mechanisms, levers, pulleys, gears, force, transfers	
Electricity					Electricity, appliance, device, mains, plug, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, connect, connection, short circuit, wire,		Electricity, appliance, device, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive, negative, terminal, connection, short circuit, wire, crocodile clip,

					crocodile clip, bulb, bright/dim, switch, buzzer, motor, faster/slower, conductor, insulator, metal/non-metal		bulb, bright/dim, switch, buzzer, volume, motor, conductor, insulator, voltage, current, resistance
Earth and Space						Earth, planets, sun, solar system, moon, celestial body, spherical, rotation, spin, night and day, names of planets, dwarf planet, orbit, geocentric model, heliocentric model, shadow clocks, sundials, astronomical clocks	
Evolution							

PROGRESSION OF SCIENTIFIC WRITE UP							
	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Question/ Title	Teacher asks	Teacher provides on sheet	Teacher provides or child copies	Child writes question			
Prediction	Oral	Sentence starter on sheet	Sentence starter	Independent sentence with reason	Sentence with reason	Explains using scientific knowledge	
Equipment	Pictures	Materials shown/provided (tick if needed)	Short list with word bank if relevant	Written list independent			
Method	Oral/ teacher models	Teacher explains orally (no writing)	Teacher explains orally (may tick steps)	Numbered steps independently	Includes fair test ideas	Includes variables	Full method with control of variables
Results	Drawings/photos	Simple table on sheet	Table and pictogram/bar chart (with support)	Table and bar chart independently	Table, bar chart, line graph	Table, bar chart, line graph, scatter graph	Full range; chooses appropriate graph type
Conclusion	Oral	Sentence starter on sheet	Sentence starter	Explains patterns	Links to scientific knowledge	Explains reliability	Explains reliability and improvements
Fair Test/ Variables			Introduced orally	Mentions fair test	Identifies variable with support	Identifies variables independently	Controls
Scientific Vocabulary	Everyday words	Word bank on sheet	Word bank	Uses key words		Uses scientific terms	