

St Michael's CE (VA) Junior School

Science Curriculum



What we teach...

Our vision is to provide an ambitious, knowledge-rich science curriculum that develops children's curiosity, critical thinking and understanding of the world around them. We want every child to recognise the importance of science in explaining the natural and physical world, appreciate its significant contribution to society, and understand its role in shaping the future.

Our curriculum is carefully sequenced to ensure that children develop secure substantive knowledge alongside the disciplinary knowledge required to work and think scientifically. Through progressive learning, children build a coherent understanding of key scientific concepts, enabling them to make meaningful connections within science and across the wider curriculum. Prior learning is deliberately revisited and built upon so that knowledge is retained in the long term and applied confidently in new contexts.

Scientific enquiry is embedded throughout the curriculum. Children are encouraged to ask perceptive questions, make predictions, plan and carry out investigations, analyse evidence, and draw reasoned conclusions. In doing so, they develop an understanding of the methods and processes of science, recognise the value of evidence-based explanations, and become increasingly confident in using scientific vocabulary with accuracy and precision.

Our curriculum is ambitious for all learners. High expectations, carefully planned progression and appropriate challenge ensure that every pupil can achieve success regardless of their starting point. Through meaningful, real-life contexts and wider enrichment opportunities, children develop an appreciation of the relevance of science in everyday life, enhancing their cultural capital and preparing them to become informed, responsible citizens.

Curriculum implementation is underpinned by high-quality teaching and informed by clear progression in knowledge and skills. Teachers use assessment purposefully to identify misconceptions, adapt teaching and ensure that children are secure before moving on. The quality of science education is continually evaluated through lesson visits, book scrutiny, pupil voice, assessment information and professional dialogue. This enables subject leaders to monitor curriculum fidelity, progression, child engagement and the quality of teaching, ensuring that the science curriculum continues to meet the needs of all learners and has a sustained, positive impact across the school.

How we teach....

Our science curriculum is delivered through high-quality teaching that enables all children to develop secure substantive knowledge alongside the disciplinary knowledge and skills required to work scientifically. Teachers follow a carefully sequenced curriculum that builds progressively on prior learning, ensuring that knowledge, scientific enquiry skills and vocabulary are revisited and developed over time.

The Science Subject Leader attends regular termly network meetings with other science leaders across the local area. These provide opportunities to share best practice, develop professional partnerships and remain informed about current developments in science education

and curriculum delivery. Key updates are shared with all staff through professional development and staff meetings, ensuring teachers maintain strong subject knowledge and confidence in delivering the science curriculum.

Adaptive teaching is embedded within planning to ensure that all children can access the ambitious science curriculum. Lessons are designed to meet the needs of all learners through appropriate scaffolding, carefully selected resources, targeted support and suitable levels of challenge, while maintaining consistently high expectations. Responsive teaching is a key feature of every lesson. Teachers continually assess children's understanding through effective questioning, observation, discussion, mini-whiteboards and a range of Assessment for Learning (AfL) strategies. Misconceptions are identified quickly and addressed through additional modelling, adapted explanations or further opportunities for practice before new learning is introduced.

High-quality questioning is central to our approach. Teachers carefully plan and deliver purposeful questions that probe understanding, challenge misconceptions, encourage scientific reasoning and deepen children's thinking. Effective questioning enables teachers to move learning forward and ensures children develop a secure understanding of scientific concepts.

Children are explicitly taught and encouraged to use accurate scientific vocabulary in every unit of work. Science working walls support this by displaying key vocabulary, concepts and the progression of learning, enabling children to confidently communicate their scientific understanding using precise language.

Working scientifically is woven throughout the curriculum rather than being taught in isolation. Children regularly plan, carry out, observe, measure, record and evaluate investigations across biology, chemistry and physics. We have developed a progressive approach to teaching scientific enquiry, beginning with simple investigations in the lower school and building towards increasingly independent enquiry in upper Key Stage 2. By the end of Year 6, children have a secure understanding of the different types of scientific enquiry and can confidently apply these skills across all areas of science.

Teachers promote independent learning by providing opportunities for children to apply their knowledge, explain their thinking, solve problems and make connections between scientific concepts. Ongoing formative assessment informs future planning, ensuring learning builds on what children know and can do.

Regular monitoring of teaching, learning and children's work demonstrates that children develop secure scientific knowledge, retain key concepts over time and confidently apply scientific principles and enquiry skills. Through engaging, memorable learning experiences and a consistent whole-school approach, children leave our school well prepared for the next stage of their science education as curious, knowledgeable and confident young scientists.

What the children learn...

In our school children are enthusiastic and passionate about science. They enjoy learning about the wider world through science and are engaged in our delivery of the learning opportunities provided. There is a clear progression of children's work and teachers' expectations in our school and children's work shows a range of units and evidence of the curriculum coverage for all science units. As they move through the school children become increasingly independent in science, selecting their own tools and materials, completing pupil led investigations and choosing their own strategies for recording. Active feedback in the form of on the spot questioning, more formal conferencing, mini plenaries or planned next step questions from teachers have impact on our children, with a view to push learning on or deal with misconceptions when they arise. Standards in science at the end of the phases are good and issues arising such as clearer progression and embedding scientific skills early on have been addressed effectively in school. Teachers' judgements are monitored internally through subject leadership. Our SLT and governors are kept up to date with developments in the way science is run in our school with subject reports, action plans and review meetings; these come in the form of an annual report to governors and termly meetings between the science governor and subject leader. Whole school science days allow the children to participate in active science often linked to the real world and modern day scenarios. Children are given the opportunity to apply not only their scientific knowledge but make links across other curriculum areas to generate solutions for real life problems. They are encouraged to think like scientists drawing on each other, subject knowledge and their developed resilience to meet a challenge. In our school, science is not a stand-alone subject but one, along with others, which is embedded throughout the curriculum therefore allowing children to make real life links in their learning.

National Curriculum Objectives for KS2 Science

By the end of Lower KS2:

- Children should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans.
- They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs.
- Children might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.

By the end of Upper KS2:

- The principal focus of science teaching in upper key stage 2 is to enable children to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

- At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.
- They should also begin to recognise that scientific ideas change and develop over time.
- They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.
- Children should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. 'Working and thinking scientifically' is described separately at the beginning of the programme of study but must always be taught through and clearly related to substantive science content in the programme of study.
- Children should read, spell and pronounce scientific vocabulary correctly.

	Year 3	Year 4	Year 5	Year 6
Working Scientifically Specific skills: - Questioning - Planning - Predicting - Observing - Measuring - Recording - Report, present, explain - Conclude	- Asking questions to set up fair tests - Understand variables and constants - Observe and measure findings - Record data in various forms - Use scientific language accurately - Report findings both orally and written - Draw conclusions based on predictions and observations - Identify similarities, differences and changes	- Asking questions to set up fair tests with increasing independence - Understand variables and constants and choose appropriately - Observe and measure findings using a range of equipment - Record data in various forms with increasing independence - Use scientific language accurately both orally and in written work - Report findings both orally and written independently	- Plan investigation to answer questions - Recognise and control variables - Perform accurate and precise measurements with a range of equipment, repeating readings where appropriate - Record data and results in a range of formats - Use results to make predictions for further work - Report, present and explain findings	- Plan investigation to answer questions generated independently - Recognise and control variables to - Perform accurate and precise measurements with a range of equipment, repeating readings where appropriate - Record data and results in a range of formats - Use results to make predictions for further work - Report, present and explain findings

		- Make links between predictions and conclusions - Identify similarities, differences and changes which are supported by observations that have been made	- Use scientific evidence to support or refute ideas and findings	- Use scientific evidence to support or refute ideas and findings
Knowledge	• What constitutes a fair test – children to be taught all of the elements of what ‘Working Scientifically’ looks like. Elements to be displayed on WW and referred to whenever an investigation is planned. LKS2 and UKS2 agreed planning formats to be used for all investigations. All children to know that a fair test involves making systematic changes and analysing data to identify how one variable influences another. • What variables and constants are – children to know that a variable can change. They must be taught how to consider the effect of changing the variable or if a controlled variable is required for an investigation • Difference between a prediction and conclusion – link to reading skills and discuss across other areas of the curriculum so that children become familiar with these terms quickly. UKS2: children to use language which proves or disproves their predictions by what they have observed in their conclusions • Know how to use different forms of recording – Children to shown a variety of recording strategies in LKS2 and then begin to choose more independently from these in UKS2 (tables, charts, graphs, written, detailed and labelled diagrams, verbal, concept maps, comparative over time diagrams and captions, interactive displays) • Know how to explain results using what has been observed – LKS2 modelled explanations using all of the evidence gathered with a view to move to more independent explanations in UKS2 • Understand safety when conducting investigations and know what equipment is required for a variety of investigations including safety equipment – Year 3: provide children with required equipment and discuss why it has been chosen Year 4: give children a range of equipment to choose from and explain choices Year 5: Children to plan their investigation and select equipment with clear explanations Year 6: children to discuss the suitability of equipment choices before planning an investigation and be given opportunities to problem solve when some equipment is unavailable e.g. what could be used to explore adaptations in birds if we can’t test real beaks?			

Plants Specific skills: - Identify - Investigating - Describing - Build on prior knowledge - Explain - Record - Observe	- Identify and describe the functions of different parts of flowering plants: - Explore the requirements of a plant for life and growth and how they vary from plant to plant - explore the parts of flowers that are used in the life cycle of flowering plants - Investigate the way in which water is transported within plants		-Describe reproduction in plants - Investigate and understand the process of pollination	
Knowledge	Year 3: Flowers – needed for reproduction Leaves – needed for nutrition Stem (or trunk for trees) – needed for support and nutrition Roots – needed for support and for nutrition Plants need water, light and air. Light enables them to make food. Food is made in their leaves. They need carbon dioxide and water to make their own food. Carbon dioxide comes from the air. They take up water from their roots. Plants get nutrients from the soil and minerals from the water in the soil. Plants need plenty of room to grow. Water travels up a plant. It is taken up from the roots (via the soil), is sucked up the stem and reaches the leaves and flowers Year 5: A plant's reproductive organs are inside the flower Stamen – contains pollen grains Petal – attracts insects to the flower Carpel – contains the eggs			

	Sepal – protects the flower when it's a bud The male part of the flower is the stamen; the anthers contain pollen; the filament holds the anther up The female part of the flower is the carpel; stigma is sticky to catch pollen; style holds the stigma up; ovary contains eggs Pollination – insects are attracted to flowers by scent or colour. The flowers make nectar which the insects feed on. When the insect feeds on the nectar, it brushes against the pollen. They then carry the pollen to the female stigma of another plant. Fertilisation – the joining of the pollen and the egg The fertilised egg becomes a seed (the ovary becomes a fruit, which contains the seeds) Seed dispersal – a scattering of seeds (there are three ways that this can happen) Wind dispersal – the seeds are light and feathery and are blown away by the wind Animal dispersal – an animal eats a fruit containing seeds and it is excreted in another location OR an animal carries seeds in its fur Explosion – the pod dries up, splits open and the seeds drop out			
Vocabulary	Year 3 – branches, bulb, carbon dioxide, common, deciduous, evergreen, flower, flowering, fruit, function, garden, germination, leaf/leaves, mature, nutrients, petal, stem, root, requirements for plants to live (air, light, water/moisture, nutrients from soil, and room to grow) Year 5 – stigma, stamen, pollen, filament, sepal, germinate, pollinate, fertilise, (photosynthesis as a discussion as a KS3 objective)			
Animals Including Humans Specific skills: - Identification - Explain processes - Describe using scientific vocabulary - Make links with prior learning	- Understand what factors contribute to a healthy lifestyle - Describe what a healthy and balanced diet looks like - Compare the diets of different animals - Identify that humans and some other animals have skeletons and muscles for support, protection and movement	- Know how the digestive system works - Humans have three types of teeth: molars, canines and incisors - Classify animal teeth based on their diet – carnivores have teeth suited to tearing flesh, whereas herbivores have teeth suited to cutting and grinding plants - Know how to keep teeth and gums healthy	- Describe changes in humans as they age - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	- identify and name the main parts of the human circulatory system - 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

	- Describe the basic parts of the skeletal system - Know how bones and muscles help us move -	- construct and interpret a variety of food chains,		animals, including humans
Knowledge	• Plants can make their own food but animals cannot. Animals (including humans) get nutrition from what they eat • To stay healthy, humans need to exercise, eat a healthy diet and be hygienic. • Animals, including humans, need food, water and air to stay alive. • Humans and some other animals have skeletons and muscles that help support and protect their body • The skeleton protects organs, support our bodies and allow movement • Skeletal muscles work in pairs to move the bones they are attached to by taking turns to contract (get shorter) and relax (get longer) • A vertebrate is an animal with a backbone • An invertebrate is an animal without a backbone • Human digestive system: Food enters our body through the mouth before passing through the digestive system. Digestion starts when teeth break down the food. Saliva is added and food passes down the oesophagus to the stomach. Food is broken down further and passes to the small intestine. Nutrients are removed and leave the digestive system. Food then passes to the large intestine where water is removed. Waste then passes out of the body via the rectum and anus. • Humans have 4 different types of teeth: incisors – used for cutting, canines – used for tearing, premolars and molars – used for grinding and chewing • A food chain always begins with a plant and ends with an animal • Living things are classified as producers, predators or prey depending on their place in the food chain • The heart is composed of four chambers; the right atrium, the right ventricle, the left atrium and the left ventricle. • The rate that your heart pumps is called your pulse • The circulatory system is made up of the heart, lungs and blood vessels • Arteries carry oxygenated blood away from the heart to the rest of the body • Veins carry deoxygenated blood from the body to the heart • Nutrients, oxygen and carbon dioxide are exchanged via the capillaries • Molars are used for crushing and grinding food, canines are used for gripping and tearing food and incisors are used for snipping and cutting food • Humans have two sets of teeth during their lives – milk teeth and permanent teeth			

	- Teeth are different in other animals – carnivores have teeth suited to killing other animals and tearing flesh. Canines are long and pointed. Herbivores have teeth suited to eating plants. - Bacteria causes tooth decay - We can look after our teeth by brushing twice a day, flossing, using toothpaste with fluoride in it, visiting a dentist regularly and not eating or drinking too many sugary items			
Vocabulary	Year 3 – backbone, bones, contract, elbow, endoskeleton, exoskeleton, joints, muscles, organs, protect, relax, skeleton, support, tendons, vertebrae, cranium, clavicle, ribs, spine, pelvis, femur, elbow, knee, hip, ankle Year 4 – absorb, acid, anus, canine, carnivore, decay, digestion, enamel, enzymes, excretion, faeces, herbivore, incisor, ingested, intestines, molar, muscles, nutrition, oesophagus, omnivore, organ, plaque, premolar, process, saliva, stomach Year 5 – adolescence, adulthood, development, foetus, genitals, gestation, growth, hormones, independent, infancy, life cycle, life processes, mature, menopause, menstruation, offspring, organ, puberty, rapid, reproduction, toddler, vertebrae Year 6 – aorta, arteries, atrium, blood vessels, capillaries, carbon dioxide, circulatory system, deoxygenated, heart, lungs, nutrients, organ, oxygen, oxygenated, pulse, respiration, vein, vena cava, ventricle, via,			
Investigate Materials Specific skills: - Year 3 Rocks - Year 4 States of Matter - Year 5 properties and changes of materials - Investigate - Ask relevant questions - Observe - Predict - Conclude - Reason	- Compare and group based on appearance and simple physical properties - Explain and understand how fossils are formed - Explain and understand how rocks are formed	- Recognise change of state based on temperature - Understand and explain evaporation and condensation - Explain how the water cycle works - Recognise how some materials can melt and solidify	- Compare and group together every day materials based on (given) properties - Know that some materials will dissolve in liquid to form a solution - Use knowledge of materials to separate mixtures. - Give reasons for uses of every day materials - Demonstrate that dissolving, mixing and changes of state are reversible changes - Explain that some changes are irreversible,	

			including changes associated with burning and the action of acid on bicarbonate of soda. - Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	
Knowledge	Year 3: • Not all rocks are the same • Hard rocks are hard to scratch or break up. Examples are: flint, granite, marble • Soft rocks are easy to scratch and crumble. Examples are: chalk, limestone • Impermeable rocks don't allow water to soak through. Most impermeable rocks are hard, e.g. slate, marble • Permeable rocks let water soak through. Most permeable rocks are soft, e.g. chalk, limestone • Some rocks contain fossils, which are the remains of living things from millions of years ago • Fossils are the remains of living things from millions of years ago. When they died, they got covered in mud and sand. Over time, the mud and sand compressed and turned into rock. The soft parts of the living thing rotted away, leaving behind a space with the shape of the living thing. The cavity fills up with small particles and also becomes compacted – this is the fossil Year 4: • Evaporation – the process of a liquid turning into a gas. Evaporation is caused by heat • The rate of evaporation depends on temperature – evaporation is slow when it's cold and fast when it's hot • Condensation – the process of a gas turning into a liquid. Condensation is caused by cooling • Freezing – the process of a liquid turning into a solid. Freezing is caused by cooling • Melting – the process of a solid turning into a liquid. Melting is caused by heating • Temperature tells us how hot or cold something is. Temperature is measured with a thermometer; it is measured in degrees Celsius (°C) • A material will change state at a certain temperature			

	- The water cycle relies on condensation and evaporation. Heat from the sun makes the water from sea, lakes and rivers evaporate into water vapour. As the water vapour rises, it cools and condenses to form clouds and then forms as rain. Clouds are condensed water vapour (tiny droplets of water hanging in the air) Year 5: - Materials can be groups according to their properties, e.g. hardness/softness, opaque/transparent, soluble/insoluble etc - Soluble materials dissolve in water. The materials do NOT disappear; the process of dissolving means they have broken down into microscopic particles - When a solid is dissolved in a liquid, it forms a solution - Materials can be separated by different methods - Insoluble materials can be filtered - Solutions can be evaporated to leave the original material - Solid materials can be separated if they are different sizes using a sieve with different sized holes - A reversible change can change back to how it was before - An irreversible change is permanent and cannot change back. A new material has been formed			
Vocabulary	Year 3 – absorb, bedrock, decaying, grain, igneous, imprint, leaf litter, magma, man-made, metamorphic, mineral, molten, natural, nutrients, palaeontology, permeable, porous, prehistoric, preserve, pressure, properties, rock, sediment, soil, surrounding, volcano, weathered, permeable, impermeable Year 4 – condensation, cooling, evaporation, freezing, freezing point, gas, heating, liquid, melting, melting point, particles, precipitation, process, properties, solid, temperature, vibrations, water cycle, water vapour Year 5 – circuit, condensation, conductor, dissolves, electricity, evaporates, filtering, flexible, gas, insoluble, insulator, irreversible, liquid, magnetic, melting, particles, permeable, process properties, rate, resistance, reversible, solid, soluble, solution, state, temperature, thermal, transparent, variable, water cycle			
Light Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude	- Recognise that light is needed to see - Know that solid (opaque) objects can block light - Understand that light can travel through transparent and translucent materials - Understand that light is reflected from surfaces			- Recognise that light travels in straight lines - Explain that objects are seen because they give out or reflect light into the eye - Use the idea that light travels in straight lines to explain that objects are seen because they give

- Reason - Challenge ideas	- Recognise that shadows are formed when light is blocked - Determine what makes the size of shadows change			- out or reflect light into the eye - Explain why shadows have the same shape as the objects that cast them
Knowledge	Year 3 • A source of light makes light • Light comes from a range of sources, both natural and manmade • The sun, and other stars, fires, torches and lamps all make their own light and so are examples of sources of light. • Humans need light to be able to see • Light does not travel through opaque objects • Light can travel through transparent and translucent materials • Shadows are created when light is blocked • The size of shadows change depending on how far away an object is from light • Know that sunlight can damage their eyes • Know how to protect their eyes from the sun • That light can be reflected, e.g., in mirrors or on different surfaces Year 6 • Light travels in straight lines • Natural sources of light occur naturally and are not man-made, e.g., the sun, stars and fireflies • Artificial light sources are made by humans, e.g., lamps, matches, computer screens etc. • Know the different parts of the human eye including iris, retina, vitreous, pupil, lens, optic nerve, and cornea. • When light hits an object, it is reflected (bounces off) and enters our eyes. This is how we see. • Light travels in rays • When light from an object is reflected by a surface, it changes direction. It bounces off the surfaces at the same angle as it hits it. • Smooth, shiny surfaces such as mirrors and polished metals reflect light well. • Dull and dark surfaces such as dark fabrics do not reflect light well.			
Vocabulary	Year 3 – angle, bright, chemical reactions, dark, dim, electricity, emits, light, mirror, opaque, product, reflects, shadows, source, sunglasses, surface, torches, translucent, transparent			

	Year 6 - angle, dark, dim, electricity, emits, light, mirror, opaque, reflects, shadows, source, surface, touches, translucent, transparent, iris, retina, vitreous, pupil, lens, optic nerve and cornea.			
Forces and Magnets Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason - Challenge ideas	- Compare how things move on different surfaces - Know that magnets have two poles - Observe how magnets attract or repel each other and attract some materials - Notice that some forces need contact between two objects, but magnetic forces can act at a distance - Predict whether two magnets will attract or repel each other, depending on which poles are facing - Compare and group materials based on whether they are attracted to a magnet		- Explain the force of gravity - Recognise the effects of Air resistance - Recognise the effects of Water resistance - Recognise the effects of friction - Recognise the effects of some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	
Knowledge	Year 3: • A force is a push or a pull • Magnets exert a force on other magnetic materials • A magnetic force can act at a distance (the magnet doesn't need to touch the objects for the force to occur) • A magnet has a north pole and a south pole – opposite poles ATTRACT; like poles REPEL • Either end will attract to magnetic materials Year 5:			

	• Gravity is a pull force – it pulls objects towards the centre of the Earth • Air resistance slows down moving objects. Streamlined objects have a smaller surface area and travel faster. Objects with a larger surface area travel through the air more slowly. • Water resistance slows down moving objects. Streamlined objects travel faster through water. Water pushes against the object moving through it. • Friction gives us grip • Friction produces heat • Friction occurs when two surfaces touch each other. Friction is a force between two surfaces. • Rough surfaces create a lot of friction; moving objects slow down faster on rough surfaces • Smooth surfaces don't create a lot of friction; moving objects do not slow down quickly on smooth surfaces • Mechanisms can be used to turn small forces into big effects • Lever – a mechanism made from a long pole and a pivot. A push on the lever enables a heavy object to be lifted • Pulley – a mechanism made from a rope and wheel. A pull on the rope enables a heavy object to be lifted • Gear – a mechanism made from wheels with teeth. When one wheel is turned, the other turns too. The two wheels turn in opposite directions.			
Vocabulary	Year 3 – attract, bendy, friction, force, gravity, magnet, magnetic field, metal, motion, non-magnetic, opposite, position, pull, push, resistance, squash, stretchy, surface, twist, push, pull, pole Year 5 – air resistance, buoyant, balanced force, direction, gears, gravity, friction, force, levers, mass, magnets, Newton's (N), pull, pulleys, push, surfaces, upthrust, unbalanced force, water resistance, streamline, mechanism			
Living Things and Their Habitats Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason		- Recognise that all living things can be classified - Explore and use classification keys to group, identify and name a variety of living things in the local and wider environment. - Recognise that environments can change and how this effect living things		- Describe and classify into broad groups according to observable characteristics, including micro- organisms, plants and animals - Give reasons for classifying plants and animals based on specific characteristics

- Challenge ideas - Classify - Gather data and present it				
Knowledge	Year 4: • Living things can be put into groups according to their features (e.g. legs, flowers or fur) • There are three main groups of living things: - ANIMALS – can’t make their own food, animals can move - PLANTS – can make their own food, plants are fixed to the ground - MICRO-ORGANISMS – a tiny living thing that can only be seen under a microscope • Vertebrates are animals with a backbone. They can be classified by groups: fish, amphibians, reptiles, birds, mammals • Invertebrates are animals with no backbone. They can be classified by groups: insects, spiders, snails and slugs • A classification key is used to identify unknown plants or animals. It is a series of questions, each with two possible answers. Each answer leads to another question until a specific conclusion is reached Year 6: • Fish breathe with gills, lay eggs in water, have fins and scales and their body temperature changes • Amphibians are born with gills then develop lungs, lay eggs in water, have damp skin and their body temperature changes • Reptiles breathe with lungs, lay eggs on land, have dry scaly skin and their body temperature changes • Birds breathe with their lungs, lay eggs with hard shells, have feathers and have a steady body temperature • Mammals breathe with lungs, give birth to live babies, have body hair or fur, have a steady body temperature and feed their babies’ milk • Plants reproduce by sexual reproduction. This is where the pollen from one plant lands on the stigma of a different plant (this is pollination), the egg is fertilised by the pollen and a seed is made. The seed germinates into a seedling and then a plant. Plants also reproduce by asexual reproduction. Examples of this would be using cuttings or bulbs to grow a new plant • Animals are produced by sexual reproduction: an egg from the mother is fertilised by a sperm from the father. A fertilised egg grows into an embryo, which develops into a baby			

Vocabulary	Year 4 – biomes, carnivore, classifications key, criteria, deciduous, environment, evergreen, excretion, food chain, habitat, herbivore, invertebrate, life process, microhabitat, insect, nutrition, omnivore, organism, reproduction, respiration, sensitivity, urban, vegetation, vertebrate Year 5- anther, bulb, cell, dispersed, dissect, embryo, fertilisation, flower, flowering, function, gamete, germination, life cycle, mature, metamorphosis, ovary, ovule, petal, plant, pollen, pollination, reproduction, seed, stigma, structure Year 6 – kingdom, phylum, class, order, family, genus, species, algae, bacteria, classification, fungi, invertebrate, micro-organism, organism species, taxonomy, vertebrate, virus, vascular, non-vascular, Carolus Linnaeus			
Sound Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason - Challenge ideas		- Recognise that sound is made by something vibrating - Recognise that vibrations from sounds travel through other matter 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		
Knowledge	• Sounds are made when objects vibrate. The vibrations disturb the air around them, making the air vibrate too. • Sound is spread out in all directions as waves • The vibrations enter your ear and you hear them as sound • Sound waves make the eardrum vibrate and then send messages to the brain			

	• The pitch of a sound is how high or low the sound is • A high sound has a high pitch and a low sound has a low pitch • A drum with a tight skin makes a high-pitched wave; a loose drum skin creates a low-pitched wave • Sounds are vibrations that travel through the air • The volume of a sound is how loud or quiet the sound is • A weak vibration doesn't travel very far • An object hit hard will make a strong vibration, meaning it will make a loud sound; an object hit gently will make a weak vibration, meaning it will create a quiet sound.			
Vocabulary	Year 4 – amplitude, decibel, electricity, energy, frequency, medium, pitch, power, sound waves, source, transmit, vibrations, inner ear, middle ear, outer ear, ear canal, malleus, semi-circular canals, vestibular nerve, facial nerve, auditory nerve, cochlea, Eustachian tube, ear drum, stapes, incus			
Electricity Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason - Challenge ideas		- Identify common appliances that run on electricity and whether they are mains or battery operated. - Construct a simple series of circuits - Name parts of a circuit - Solve basic circuit faults - Recognise some common conductors and insulators, and associate metals with being good conductors -	-	- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used - 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.
Knowledge	Year 4: • Electricity comes from mains or batteries • Electricity can be dangerous • Electricity can only travel if there is a complete circuit; it travels from the power source around a series of conductors			

	- Simple circuits can be set up using components. A component is something that can go into a circuit. Examples of components are: buzzer, battery, bulb, wire - Circuits must be set up correctly so the electricity can flow around the circuit - Conductor – a material that allows electricity to pass through - Insulator – a material that does not allow electricity to pass through - Cell (battery) – a power source, wires (made of metal), bulb (creates light), buzzer (creates sound), motor (creates movement), switch (controls the flow of electricity around a circuit) Year 6: - Bulbs can be made brighter, buzzers can be made louder, motors can be made faster by: adding more batteries or using batteries with a higher voltage - Bulbs can be made dimmer, buzzers can be made quieter, motors can be made slower by adding more bulbs, buzzers or motors - The more power within a circuit – the more effective the components - The more components within a circuit (but the same amount of power) – the less effective the components			
Vocabulary	Year 4 – appliances, battery, bulb, buzzer, cell, circuit, component, conductor, current, device, electricity, energy, fuel, generate, insulator, mains, motor, power, source, switch, wires Year 6 – appliances, battery, bulb, buzzer, cell, circuit, component, conductor, current, device, electricity, energy, fuel, generate, insulator, mains, motor, power, resistance, resistor, source, switch, voltage, wires,			
Earth and Space Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason - Challenge ideas			- Movement of the Earth and other planets in relation to the sun in the solar system - Movement of the moon in relation to the Earth - Describe sun, moon and earth as approximately spherical bodies - Explain day and night and apparent movement of sun across the sky	
Knowledge	- The sun is a star and is the centre of our solar system. It gives off light, and makes life possible on planet Earth - The Earth is one of eight planets that travels around the Sun			

	• The planets are called Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune • The solar system is also home to lots of asteroids, moons, and dwarf planets such as Pluto • Earth is about 4.5 billion years old • Earth spins at 1000 miles per hour. It takes 24 hours to complete a full rotation • Stars are orbited by planets • The Sun is approximately spherical in shaped and is around 1,300,000 bigger than Earth • It's daytime on the side of the Earth that faces the Sun and night on the side that is facing away • Earth takes a year to travel around the Sun • Planet Earth has one moon, which is held in orbit by gravity • There are four rocky planets – Mercury, Venus, Earth and Mars. They are the closest planets to the sun • Rocky planets are made of rocks and metal. They have a solid surface and a core which is manly made or iron. • There are four gas planets – Jupiter, Saturn, Uranus, and Neptune. They are the furthest planets from the Sun. These planets are bigger than the rocky planets and have many more moons. • Gas planets are balls of hydrogen and helium – you couldn't stand on the surface on the planet because it's not solid.			
Vocabulary	Year 5- asteroid, axis, comet, galaxy, gravity, leap year, meteorite, orbit, planet, shadow, Solar system, sphere, spin, star, time zones, universe			
Evolution and Inheritance Specific skills: - Ask relevant questions - Plan investigations - Predict - Observe - Conclude - Reason - Challenge ideas - Classify - Gather data and present it				- Recognise that living things have changed over time - Recognise that 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.
Knowledge	• Evolution means a gradual change over time • Inheritance - the characteristics received from parents through genes • Adaptation is the action of a living things changing to suit the environment • A habitat refers to a specific area or place in which particular animals and plants can live • An environment contains many habitats and includes areas where there are living and non-living things • Natural selection is the process by which species that are best adapted to their environment survive and reproduce, while less well adapted species die out • Characteristics are the distinguishing qualities, traits or features of a living thing • Plants and animals produce offspring that are similar but not identical to them • Offspring are the young animal or plant that is produced by reproduction of that species • Variation is differences between cells, individual organisms, or groups of organisms of any species caused either by genetic differences or by the effect of environmental factors. There is variation within all species • Adaptive traits are characteristics that are influenced by the environment, for example the ability to play football, etc. • Inherited traits are characteristics that are inherited from parents, such as eye colour, shape or earlobes, etc. • Fossils are the preserved remains (or partial remains) of ancient animals and plants			
Vocabulary	• Year 6 – adaptation, ancestor, biodiversity, biome, breeding, characteristic, environment, evolution, extinct, fossil, generation, inherit, maladaptation, mutation, natural selection, offspring, palaeontology, reproduction, species, survive, theory, variation			