Beamont Primary School Science

Curriculum INTENT

CORE VALUES: **CHILDREN FIRST** **RESILIENCE** **PIONEERING**

Areas of working scientifically: Fair & comparative testing | Research using secondary sources | Identifying, classifying & grouping | Pattern seeking | Observing over time

Beamont Primary School- SCIENCE progression through EYFS
UTW- The Natural World

Playing & Exploring - Engagement	Active Learning - Motivation	Creating & Thinking Critically - Thinking
• Finding out & exploring • Playing with what they know • Being willing to 'have a go'	• Being involved & concentrating • Keep on trying • Enjoying achieving what they set out to do	• Having their own ideas (creative thinking) • Making links (building theories) • Working with ideas (critical thinking)

Understanding the World- The Natural World ELG -
- 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

Focus	Seasonal changes	Everyday materials	Plants	Animals including Humans	Vocabulary- To be used daily.
Nursery Skills	• Explore different habitats outdoors, e.g. scent, colour & shape of flowers attracting bees • Observe growth & decay over time • Begin to understand the need to respect & care for the natural environment & all living things • Talk about what they see, using a wide vocabulary •	• Explore materials with different properties • Explore natural materials, indoors and outdoors. • Explore collections of materials with similar and/ or different properties. • Talk about the differences between materials and changes that they notice.	• Observe plants closely through a variety of means e.g. magnifiers & photographs • Begin to understand the need to respect & care for the natural environment & all living things • Extend vocabulary: leaves, petals, roots, bulb, trunk, branches, stem, garden plants, wild plants, seeds • Use all the senses in hands-on exploration of plants • Understand the key features of the life cycle of a plant	• Observe animals closely through a variety of means e.g. magnifiers & photographs • Look at key stages of development from birth to adult • Observe & describe in words or actions the effects of physical activity on body • Understand the key features of the life cycle of a butterfly • Understand the key features of the life cycle of an animal	Senses, experiment, **plants – leaf, stem, root, flower, animals, humans, materials, change, growth, environment, heavy, light, float, sink, baby, toddler, child, egg, caterpillar, chrysalis, seasons, melt, freeze, hard, soft, kitten, puppy, foal, calf etc**

Children to be exposed to key vocabulary daily in provision. High quality text to be chosen for story times that allow for questioning opportunities relating to key events. The outdoor classroom will be used as a key feature in our science learning through the natural world. Trips to the farm and the zoo will be used to enhance children experiences of animals and class experiences of hatching our own chicks and caring for our own caterpillars/butterflies.

Beamont Primary School- SCIENCE progression through EYFS
UTW- TheNatural World

Active Learning - Motivation	Active Learning - Motivation	Creating & Thinking Critically - Thinking
• Being involved & concentrating • Keep on trying • Enjoying achieving what they set out to do	• Being involved & concentrating • Keep on trying • Enjoying achieving what they set out to do	• Having their own ideas (creative thinking) • Making links (building theories) • Working with ideas (critical thinking)

Understanding the World- The Natural World ELG -
- 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

Focus	Seasonal changes	Everyday materials	Plants	Animals including Humans	Vocabulary- To be used daily.
Reception Skills	• Describe what they see, hear & feel whilst outside • Observational drawings of the natural world • Discuss how to care for the living things & their habitats • Examine change over time • Express opinions on natural & built environments & opportunities to hear different points of view on the quality of the environment. Use words such as busy, quiet, pollution • Understand the effect of changing seasons on the natural world around them	• Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes that they notice •Characteristics of liquids & solids e.g. cooking eggs, melting chocolate • Observe & interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object & a boat floating on water	• Extend vocabulary: blossom, buds, bulb, evergreen, deciduous • Describe what they see, hear & feel whilst outside • Name & describe some plants • Draw pictures of plants	• Shows some understanding that good practices with regard to exercise, eating, drinking water, sleeping & hygiene can contribute to good health • Describe what they see, hear & feel • Identify different parts of their body & animals • Be able to show care and concern for living things • Know the effects exercise has on their bodies • Have some understanding of growth and change • Talk about things they have observed including animals • Observational drawings of animals	**Test, fair, why, senses, world, plants – leaf, stem, root, flower, animals, humans, materials - waterproof, natural, change, growth, decay, environment, heavy, light, float, sink, stretch, snap, magnetic, baby, toddler, child, teenager, adult, egg, caterpillar, chrysalis, bark, stick, branch, seasons, melt, liquid, solid, hard, soft, kitten, puppy, foal, calf etc**

Children to be exposed to key vocabulary daily in provision. High quality text to be chosen for story times that allow for qu estioning opportunities relating to key events. The outdoor classroom will be used as a key feature in our science learning through the natural world. Trips to the farm and the zoo will be used to enhance children experiences of animals and class experience s of hatching our own chicks and caring for our own caterpillars/butterflies.

Year 1: Science skills progression

POS

Year 1 Seasonal changes

•observe changes across the 4 seasons
•observe and describe weather associated with the seasons and how day length varies

Year 1 Everyday materials

•distinguish between an object and the material from which it is made
•identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
•describe the simple physical properties of a variety of everyday materials
•compare and group together a variety of everyday materials on the basis of their simple physical properties

Year 1 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

Year 1 Animals including humans

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores
- Describe and compare the structure of a variety of common animals
- Identify, name, draw and label the basic parts of the human and say which part of the body is associated with which sense

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.
- Use books from the library service linked to Science topics

Year 1– End points	
Seasonal changes	• Know which months are - Winter (December, January, February), Spring (March, April, May), Summer (June, July, August) and Autumn (September, October, November) • Observe changes across the four seasons – weather, temperature, animals, plants • Explain what weather is usually associated with which season – Winter (snow, ice, cold rain), Spring (warmer, increased rainfall can cause floods), Summer (sun, temperature normally hottest of the year) and Autumn (temperature cools down, rain)
Everyday materials	• An object is something which can be seen or touched • Objects can be made from one or more materials • Know that a material is the matter from which a thing is or can be made from • Know that natural materials come from plants, animals or the ground • Name a variety of natural everyday materials – water, wood or rock • Know that man-made materials have been made by man • Name a variety of man-made materials – plastic, metal or glass • Can name and know the meanings of some physical properties of every materials – transparent – allows light through, rigid – not flexible, absorbent – able to soak up liquid easily
Plants	• Plants are a living organism – wild plants grow without human invention and garden plants grow in a garden with human invention • Name a garden or wild plant – garden – Fuchsia, wild – Dandelion • Know the meaning of an evergreen tree and can give an example - has leaves throughout the year that are always green - pine • Know the meaning of a deciduous tree and give an example – shed their leaves seasonally – oak • Know that flowering plants have roots, stem, leaf, flower/petal and seed • Know the structure of a tree – trunk, branches, leaves, blossom and fruit

Animals including humans Classification of animals	• Can name the 5 senses for the human body - see, touch, smell, taste, hear • Animals can have different diets – carnivore eats other animals, herbivore eats plants and omnivore eats both plants and animals • Can name the 5 varieties of common animals - Fish – trout, amphibians -frog, reptiles - snake, birds - robin and mammals – human and dog • Can name the structure of common animals – Fish have fins, amphibians their skin absorbs water, reptiles have tough scales, birds have a light skeleton system and mammals have hair or fur.

Year 2: Science skills progression	
POS **Year 2 Animals including humans** • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene **Year 2 Use 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 •find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching **Year 2 Plants** 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 **Year 2 Living things and their habitats** • explore and compare the differences between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	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. • Use books from the library service linked to Science topics

Year 2– End points	
Animals including humans Animals basic needs	• Animals can have offspring which grow into adults • Name a life cycle (either frog, butterfly, chicken or human) • For survival - animals need water (fresh water for bodies to function), food (provides energy for existing cells and creates new cells) and air (oxygen to live) • Can explain why exercise, good hygiene and diet is important to animals (improves health and reduces the risk of developing diseases), good nutrition is part of leading a healthy life style, eat a balanced diet
Use of everyday materials	• Can name the uses for a variety of materials – wood (fuel, making tools, weapons furniture and paper), metal (screws, pots for cooking), paper (books, newspapers, money), rock (household tiles, statues) • Can name the ways solid objects can be changed by – squashing, bending, twisting and stretching
Plants	• Describe that a seed can grow into a new plant, they need water to grow but not light and they store food inside them • Plants grow from bulbs, store food need water but not light • Seeds/bulbs grow into mature plants by being planted, growing roots, small plant will grow through the soil, plant then takes own food from the soil and continues to grow. • Can name types of seeds – sunflower, apple • Can name types of bulbs – daffodil, onion • Know in order for plants to stay healthy they need – water, light and suitable temperature to grow
Living things and	• Explain the difference between living (grow), dead (no longer alive) and never been alive (doesn't grow) • Name the 5 things all living things need – food, water, shelter, warmth and space

their habitats	• Can name different habitats for plants and give an example – grassland (ryegrass, wild oats), forest (ferns, foxgloves), pots (tomatoes, peas), desert (prickly pear, aloe vera, cactus), river (pondweed, waterweed), and tundra (artic moss, artic poppy) • Name habitats for animals and give examples – grassland (elephant, zebra, lion), desert (camel, scorpion), river (turtle, fish, crab), tundra (polar bear, snowy owl), and forest (squirrel, deer, bird) • Explain what a microhabitat is - a small specialized habitat within a larger habitat – decomposing log (earthworm, centipede, beetle), temporary pool of water (water mites), and under rocks (worm, ant, cricket) • Animals obtain food from other animals and plants • Explain a simple food chain and name different sources of food (grass, snail, bird)

Year 3: Science skills progression

POS

Year 3 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

•identify that humans and some other animals have skeletons and muscles for support, protection and movement

Year 3 Light

•recognise that they need light in order to see things and that dark is the absence of light

•notice that light is reflected from surfaces

•recognise that light from the sun can be dangerous and that there are ways to protect their eyes

•recognise that shadows are formed when the light from a light source is blocked by an opaque object

•find patterns in the way that the size of shadows change

Year 3 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

Year 3 Plants

•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

Year 3 Forces and magnets

•compare how things move on different surfaces

•notice that some forces need contact between 2 objects, but magnetic forces can act at a distance

•observe how magnets attract or repel each other and attract some materials and not others

•compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials

•describe magnets as having 2 poles

•predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Working scientifically:

asking relevant questions & using different types of scientific enquiries to answer them

● setting up simple practical enquiries, comparative & fair tests

● making systematic and careful observations & where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers & 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, & tables

● reporting on findings from enquiries, including oral & written explanations, displays or presentations of results & conclusions

● using results to draw simple conclusions, make predictions for new values, suggest improvements & 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.

Use books from the library service linked to Science topics

Year 3– End points	
Animals including humans	• Name the 7 types of nutrition animals need - water (essential for survival), carbohydrates (gives animals energy and prevents loss of muscle mass), protein (helps form muscles), fats (boosts absorption of vitamins and protects the organs of the body), vitamins (help the bones grow and support the immune system), minerals (helps the body to work properly), and fibre (helps the digestive system stay healthy) • Explain animals cannot make their own food and they get nutrition from what they eat • Animals with skeletons and muscles have them to support the body, protect the organs and help the body to move • Name some major muscles and bones - muscles (biceps, triceps and quadriceps) and bones (clavicle, pelvis and sternum)

Light	• Explain light is needed in order to see things and dark is the absence of light • Can explain and name different types of light natural (suns, stars, fire) and artificial (light bulbs, LED lights, fluorescent lighting) • Light is reflecting from surfaces • Give a reason as to why the sun is dangerous for eyes and explain how they can be protected • Explain how a shadow is formed – when a light sources is blocked by a solid object • Explain that the size of a shadow depends how close (bigger) or far away (smaller)it is from the light source
Rocks	• Name the main three types of rocks and give an example – sedimentary (chalk, limestone, shale, sandstone), metamorphic (slate, marble, quartzite, anthracite) and igneous (basalt, granite, pumice, obsidian) • Explain rocks can be group based on physical properties and can give examples – hard/soft, permeable/impermeable or durability • Explain fossil formation - A plant or animal dies in a watery environment, the plant or animal is buried in mud and silt, soft tissues quickly decompose leaving the hard bones or shells behind, over time sediment builds over the top and hardens into rock. • Name a type of soil and explain it is made from rocks and organic matter – clay, sandy, loamy, peaty, chalky, silty
Plants	• Can explain the function of a flowering plant - roots (anchors the plant, absorbs nutrients and water for growth), stem/trunk (supports the plants, elevates the leaves and flowers, transports water between the roots and the rest of the plant), leaves (produce food for the plant by photosynthesis) and flowers (the reproductive part of the plant) • Depending on the plant, they need a certain amount of water, air, light, nutrients from soil and room to grow for life and growth. • Explain water can be transported by roots through the stem to the leaves and flower • Describe how flowering plants can reproduce – pollination (pollen carried by insects or blown by the wind from one flower to another), seed formation or seed dispersal (movement of seeds or transportation away from the parent plant or can be scattered by wind, animals, explosion, water and animal excretion) • Name the life cycle of a plant - seed germination, growth, reproduction, pollination and seed dispersal
Forces and magnets	• Objects can move differently on different surfaces – friction (is the contact force between two objects moving against each other), gravity (force that pulls objects down slopes or makes them fall) • Some forces need contact between two objects but magnetic forces can act at a distance • Give examples of materials which are magnetic (iron, cobalt, nickel, steel) and which repel (wood, plastic, water) • Magnets have two poles – North to North and South to South repel, North to South or vice versa attract

Year 4: Science skills progression

POS

Year 4 animals including humans

•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

Year 4 Sound

•identify how sounds are made, associating some of them with something vibrating
•recognise that vibrations from sounds travel through a medium to the ear
•find patterns between the pitch of a sound and features of the object that produced it
•find patterns between the volume of a sound and the strength of the vibrations that produced it
•recognise that sounds get fainter as the distance from the sound source increases

Year 4 Electricity

•identify common appliances that run on electricity
•construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
•identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
•recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
•recognise some common conductors and insulators, and associate metals with being good conductors

Year 4 Living things and their habitats

•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

Year 4 States of matter

•compare and group materials together, according to whether they are solids, liquids or gases
•observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
•identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Working scientifically:

asking relevant questions & using different types of scientific enquiries to answer them

● setting up simple practical enquiries, comparative & fair tests
● making systematic and careful observations & where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers & 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, & tables
● reporting on findings from enquiries, including oral & written explanations, displays or presentations of results & conclusions
● using results to draw simple conclusions, make predictions for new values, suggest improvements & 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.

Use books from the library service linked to Science topics

Year 4– End points	
Animals including humans	• Explain the basic parts and functions of the digestive system - Mouth and teeth (breaks down food by chewing), salivary glands (produces saliva and lubricates the food so it can go down the oesophagus), Oesophagus (tube which moves food to the stomach), stomach (breaks down the food more and produces acid), pancreas (makes hormones (including insulin) to regulate the blood glucose level. Also, makes enzymes that break down food in the intestines), liver (stores energy and helps get rid of toxins), gallbladder (stores bile and releases it to help digest fats), small intestine (absorbs nutrients and minerals from food), large intestine (absorbs water from food), rectum (stores stool until it leaves the body) and anus (where stool leaves the body) • Different types of human teeth – incisors (bite off and chew food), canines (tear and rip food) and molars (crush and grind food) • Consumers are animals who don't make their own food but they eat plants and other animals • Animals which are eaten are called prey • Predators are animals who each other animals
Sound	• Explain that sounds are made by continuous vibrations and the vibrations sends waves into the ear • Sound can travel through different materials and give examples – solid (metal, stone wood), liquid (water) An • and gas (air) • Louder the sound (the stronger the vibrations), sounds become fainter as the distance increases • High pitch (fast vibrations), low pitch (slower vibrations)
Electricity	• Give examples of common appliances that run on electricity - television, fridge/freezer, microwave, washing machine, lights • Name the basic parts of a simple circuit – cells, wires, bulbs, switches, buzzers • Explain why a lamp in a simple circuit will (circuit is a complete loop) or won't light (break in the circuit) • Know that a switch open (will not light a bulb – circuit incomplete), switch closed (will light a bulb – circuit complete) • Conductors (easily allow electric to pass through) and insulators (does not let electricity pass through easily) • Give an example of a good conductor (metal - aluminium, copper, gold, water, people) and good insulators (rubber, plastics, wood , paper)
Living things and their habitats	• Can give examples of how living things can be grouped – invertebrates (no backbone) and vertebrates (have a back bone) • Can use a classification key to help group, identify and name a variety of living things – e.g. Can it fly, does it crawl, does it belong in… does it grow out of the… - can identify different types of invertebrates (warm blooded, breath through gills, hatch from eggs) and vertebrates • Give an example of how environments can change and how it can potential pose a danger to living things -global warming, litter, oil spill, chemical pollution, deforestation and land development
States of matter	• Explain the differences between solids, liquids and gases and group objects into them categories • Can explain materials can change state when heated (solid into a liquid, liquid into a gas) or cooled (liquid into a solid, gas into a liquid) • Explain that in the Water cycle - evaporation (liquid water (in the ocean, lakes, or rivers) evaporates and becomes water vapour) and condensation (water vapour in the atmosphere condenses and becomes liquid) and water evaporates faster if the temperature is higher.

Year 5: Science skills progression	
POS **Year 5 Animals including humans** •describe the changes as humans develop to old age **Year 5 Forces** •explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object •identify the effects of air resistance, water resistance and friction, that act between moving surfaces •recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect **Year 5 Earth and Space** •describe the movement of the Earth and other planets relative to the sun in the solar system •describe the movement of the moon relative to the Earth •describe the sun, Earth and moon as approximately spherical bodies •use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky **Year 5 Living things and their habitats** •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 **Year 5 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 •know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution •use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating •give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic •demonstrate that dissolving, mixing and changes of state are reversible changes •explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	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, taking repeat readings when appropriate ● recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, 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 and degree of trust in results, in oral and written forms such as displays and other presentations ● identifying scientific evidence that has been used to support or refute ideas or arguments. Use books from the library service linked to Science topics

Year 5– End points	
Animals including humans	• Changes in humans – Baby - (drink milk after they are born. Start eating solids when their teeth start to appear at about 6 months. Can crawl by 9 months and begin to walk after they are 1) • Child - running, talking and learning to read, write and count are all developing in a child. As well as developing skills - developing socially, emotionally, physically and psychologically

	• Adolescent – (9-19), become more independent, begin puberty ready for reproduction and become ready for adulthood, Adulthood - body is at its physical peak of fitness and strength and are able to be completely independent. This is when most humans reproduce. Late adulthood/ old age - body declines in fitness and health from 60 years onwards and there is an increased dependence on others to look after them as time goes on. The life cycle ends when a human dies. • Changes for girls - The first physical changes during puberty are breast development and body growth. Growth of underarm and pubic hair. Increase in weight - hormonal changes cause the ovaries to start releasing the eggs - trigger the monthly menstrual cycle • Changes for boys: Body growth and growth in the size of their sex organs. Their muscles become more developed. Acne and facial and body hair starts to grow.
Forces	• A force - any interaction that, when unopposed, will change the motion of an object • Gravity - the force by which a planet or other body draws objects toward its centre. Air resistance - describes the forces that are in opposition to the motion of an object as it passes through the air thus slowing the object down. Water resistance – A force that is cause by water with the force acting in the opposite direction to an object moving through the water. Friction - the resistance that one surface or object encounters when moving over another. • Simple machines that allow a smaller force to have a greater effect - lever - a rigid bar resting on a pivot, used to move a heavy or firmly fixed load with one end when pressure is applied to the other. Pulley - a wheel with a grooved rim around which a cord passes, which acts to change the direction of a force applied to the cord and is used to raise heavy weights. Gear - a toothed wheel that works with others to alter the speed of a driving mechanism and the speed of the driven parts
Earth and Space	• Earth is a sphere, spins on an axis as it travels round the sun, when one sides faces the sun the other faces space • The side facing the sun is bathed in light and heat (daytime) Side facing space, cooler and darker (night) • A day on Earth last 24 hours – how long it takes to orbit the sun • Earth's tilt on its axis is what causes the 4 seasons. Sometimes it points towards the sun and other times it points away from the sun. • Moon - moves around the Earth in an approximately circular orbit, once around the Earth in approximately 27.3 days • As it orbits the earth its position changes, relative to the stars.
Living things and their habitats	• Typically 4 stages of the life cycle - birth , growth , reproduction and death • Life cycle of a mammal - live young born and get milk from mothers, grow from babies to adults, reproduce then die • Life cycle of an amphibian - egg in jelly laid in water, develops tail and legs, grows lungs to breathe and leaves water, takes 2 years to grow to adult size • Life cycle of an insect - eggs laid by the female insect, larva – Eggs hatch and larva is born. It sometimes looks different to the adult self, pupa – When the larva moults for the last time, a pupa is formed. It acts as a camouflaged, protective shell for the larva to transform, Adult – The adult breaks out of the pupa and matures. Some insects only have a 3 stage: The insect is born as an egg, hatches as a nymph and changes into an adult. • Life cycle of a bird – Egg, hatches and is fed by the parents, juvenile– leaves the nest when flight feathers are grown, adult attracts mate to reproduce • Reproduction in plants - the production of new offspring in plants, sexual reproduction involves pollen from one flower fertilising the egg of another to produce a seed, Only one parent is needed in asexual reproduction and the offspring are exact copies.
Properties and changes of materials	• Materials can group based on their properties – hardness, solubility, transparency, conductivity and response to magnets • Some materials will dissolve in liquid to form a solution e.g. salt in water how to recover a substance from a solution - evaporation • Sieving or filtering a way to separate two solids of different sizes (flour and raisins) • Dissolving, mixing and changes of state are reversible changes • Some changes result in the formation of new materials, this kind of change is not usually reversible - Burning and Action of acid on bicarbonate of soda

Year 6: Science skills progression	
POS **Year 6 Animals including humans** •identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood •recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function •describe the ways in which nutrients and water are transported within animals, including humans **Year 6 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 **Year 6 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 **Year 6 Evolution and inheritance** •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 **Year 6 Light** •recognise that light appears to travel in straight lines •use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye •explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes •use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	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, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, 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 and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments. Use books from the library service linked to Science topics

Year 6– End points	
Animals including humans	• Nutrients - transport throughout body through blood via capillaries, tiny blood vessels that connect arteries to veins. Nutrients, oxygen and wastes all pass in and out of the blood through the capillary walls • A drug - medicine or other substance which has a physiological effect when ingested or otherwise introduced into the body. Stimulants speed or 'stimulate' the central nervous system making you feel more alert and confident. Can cause increased heart rate, blood pressure and body temperature, reduced appetite, agitation and sleeplessness • Main parts of human circulatory system - Heart (an organ that pumps blood throughout the body), blood vessels, (transport blood throughout the body), blood (supplies oxygen and essential nutrients to cells and tissues) • Blood vessels - Arteries (Take blood AWAY from the heart to the body organs and tissues. When blood is pumped through these, you can feel your pulse), Veins (Take blood TOWARDS the heart from body organs and tissues) Capillaries (tiny blood vessels which take the blood into organs and tissues).
Electricity	• Voltage - the difference in electrical energy between two parts of a circuit, bigger the voltage, bigger the current • Current - amount of electricity flowing through the circuit (a flow of electrons moving in a loop in the circuit). • Cells - More cells and voltage through a circuit the brighter (bulb) or louder (buzzer), Less cells and voltage through a circuit the dimmer (bulb) or quieter (buzzer) • Longer wires (bulb dimmer) - This is because there is more resistance. • More batteries, the bulbs will get brighter - This is because there is less resistance and a greater current. • Parallel circuit - more than one resistor (bulb) and they are arranged on many paths. Found in most homes and devices - provides more than one way for a current to flow through to a device. • Recognise symbols of a simple circuit
Living things and their habitats	• Classification - the arrangement of animals and plants in groups according to their observable characteristics • Classified into broad groups- Invertebrates (insects, arachnids, snails, worms), Vertebrates (reptiles, fish, amphibians, birds, mammals), Plants (Non-flowering and flowering), Micro-organisms- (Bacteria, fungi (yeast and mould) viruses, algae, protists) • Micro-organism - is microscopic, making it too small to be seen unaided by the human eye • Examples of useful micro-organisms – in dairy products to make butter, cheese and yoghurt, used to make bread, in sewage treatment
Evolution and inheritance	• Evolution - a change in the characteristics of living things over time. It happens when there is competition to survive (natural selection). Happens when there are differences within a species caused by inheritance and mutations. • Inheritance - something is passed on to the next generation. Offspring are not identical to their parents and some characteristics are inherited. Other differences new in the offspring – mutations • Fossils provide information about living things that inhabited the Earth millions of years ago • Animals and plants that have adapted to their environment - camel has humps of fat storage to use up for energy in the dry desert when there is a shortage of food, polar bear has camouflaged itself against white snow/ice so it can hunt without being seen, cactus stores water to help keep it alive in the desert. • Adaptation leading to evolution - Evolution by natural selection, organisms that possess heritable traits that enable them to better adapt to their environment compared with other members of their species will be more likely to survive, reproduce, and pass more of their genes on to the next generation
Light	• Light appears to travel in straight lines until it hits something else • Light travels directly from a light source to the eye and it travels from a light source to an object and then to the eye • Shadows are formed when light is blocked by an object - Because light travels in straight lines, the resulting shadow will mimic the shape of the object. • Refraction – objects look bent in water

CORE VALUES: **CHILDREN FIRST** **RESILIENCE** **PIONEERING**