Our Mission: To drive personal and academic excellence; everyone, every day.

The Meadows Primary Academy

Science

Core Values: Resilience, Respect, Team Work, Aspiration, Kindness, Curiosity
Golden Threads of our Curriculum: R-A-I-S-E

Our Mission: To drive personal and academic excellence; everyone, every day.

The Meadows Primary Academy - 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	Senses, experiment, plants – leaf, stem, root, flower, animals, humans, materials, change, growth, environment, heavy, light, baby, toddler, child, egg, caterpillar, chrysalis, seasons, melt, freeze, hard,

Nursery Knowledge	Autumn Ourselves/Celebrate	Spring Moving on up/What a wonderful world	Summer What's the story? /Rescue me
	• Name & identify body parts- facials features, arms, legs, fingers and toes • Know the names of different body parts & what they do • To know how to brush their teeth correctly • Know about the different seasons & the effect they have on plants, trees &creatures. •Using images can make sense of their own life- the change from baby to child •Use all their senses in hands-on exploration of natural materials	• Most plants start growing from a seed or bulb • All plants need water & light to grow & survive • Know the correct terms to describe the life-cycle of a butterfly • Know how to care for plants • Know & talk about the life-cycle of a plant Know the names of the basic parts of a plant & tree • Can use a magnifying glass	• Know the effects of exercise on the body e.g. heart beats faster, get hotter • Know the different properties of material e.g. wood, plastic, metal To understand there are different forces such as push, pull, the weather and magnetic forces

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.

Experiences	SMSC	British Values	The Meadows Values
Trip to farm Chick Class caterpillars/butterflies	Spiritual- by asking questions about the world around them Moral – children are taught how to look after their environment during outdoor learning.	Respect is taught through the need to care for the natural environment Individual liberty is taught through actively encouraging the choices the make when exploring their environment	Team Work is taught when the children are working as part of a team during experiments. Respect and Kindness listening to others viewpoints. Respect– the environment around you

The Meadows Primary Academy - UTW- The Natural 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, bark, stick, branch, seasons, melt, liquid, solid, hard, soft, kitten, puppy, foal, calf etc

Reception Knowledge	Autumn "Who am I?"	Spring "Food to Fork"	Summer "Where will we go now? /Water water everywhere."
	• Can name own body parts using the text Funny Bones as a support. All above + shoulders, ribs, backbone, knees, elbow • Can piece back together the parts of the body and locate upon request. • Can describe key function of the skeletal system • Can describe what changes occur as they change from a baby to an adult • Can name the 4 seasons	• All plants need water, light and warmth to grow and survive • A seed produces roots to allow water to get into the plant and shoots to produce leaves to collects the sunlight • Can describe the lifecycle of a sunflower •Can describe the life cycle of a chick using correct terminology eg embryo, incubation, hatching •Knows that meat is produced from animals	•Know the effects of heating and cooling on ingredients such as melting and freezing •Can classify a set of objects by their materials- Wood, plastic, fabric, and glass. •Can name the characteristics of materials • •Can describe the most suitable materials for building and give explanations as to why.

	• Can talk about similarities and differences between each season • Can name the characteristics of each season		

Seasonal changes	Everyday materials	Plants	Animals including humans
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.			

Experiences	SMSC	British Values	The Meadows Values
	Spiritual- by asking questions about the world around them Moral – children are taught how to look after their environment during outdoor learning.	Respect is taught through the need to care for the natural environment Individual liberty is taught through actively encouraging the choices the make when exploring their environment	Team Work is taught when the children are working as part of a team during experiments. Respect and Kindness listening to others viewpoints. Respect– the environment around you

Biology	Chemistry	Physics
Plants **Animals including humans**	**Everyday materials**	**Seasonal Changes**

Cycle A: Science skills progression	
POS **Cycle A- Animals including humans (Classification)** 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 **Cycle A- Everyday materials (uses)** 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 **Cycle A- 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 **Cycle A: 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 needs of different kinds of animals and plants, and how they depend on each other	**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

Strand	Living things and their habitats	Everyday materials (uses)	Plants	Animals including humans (Classification)
Vocabulary	living, dead, habitat, micro-habitat, plants, dependable, food, water, shelter, warmth, space, grassland, desert, river, tundra, forest, food chain, predator, prey	solids, squashing, bending, twisting and stretching, wood, metal, plastic, glass, brick, rock, paper, cardboard.	seed, bulb, mature plant, ware, light, temperature,	see, touch, smell, taste, hear, diet, carnivore, herbivore, omnivore, Fish, amphibians, reptiles, birds, mammals

Cycle A- End Points	
Animals including humans (Classification)	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.
Everyday materials (uses)	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 their habitats	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 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 (arctic moss, arctic 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)

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	Living things and their habitats	Everyday materials (uses)	Plants	Animals including humans (Classification)
Key Scientists	**Sylvia Earle** – marine biologist and explorer **Sir Earnest Shackleton** – Antarctic explorer	**Robert Gair** – inventor **Ole Kirk Christiansen** - inventor	**ropertiesJane Colden** – botanist **Agnes Arbour** - botanist	**Jane Goodall** – primatologist **Joan Beauchamp Procter** – Zoologist **Maria Sibylla Merian** – Scientific illustrator and entomologist **Louis Pasteur** – biologist and chemist
Linked Texts	**The Big Book of Bugs** – Yuval Zammer	**Somebody Swallowed Stanley** – Sarah Roberts & Hannah Peck	**Sunflower Shoots and Muddy Boots** – Katherine Halligan & Grace Easton	**Lots: The Diversity of Life on Earth** – Nicola Davies & Emily Sutton

Experiences	SMSC	British Values	The Meadows Values
	Moral – all children have the right to clean water and food	Respect and Tolerance – animals and people have different diets (herbivore/vegetarian or vegan) Democracy – take turns when grouping vertebrates	Team Work is taught when the children are working as part of a team. Respect and Kindness listening to others viewpoints. Respect– the environment around you Team Work: Working as a team during experiments

Biology	Chemistry	Physics
Animals, including humans (Classification) **Living things and their habitats** **Plants**	**Everyday materials (Uses)**	**Seasonal Changes** *(changes and weather)ongoing throughout the year*

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Cycle B: Science skills progression	
POS **Cycle B - Seasonal changes** Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies **Cycle B: Plants (Basic Structure of flowering 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. **Cycle B: Everyday materials (Classification and Properties)** 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 **Cycle B: Animals including humans (basic needs)** 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	**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

Strand	Everyday materials (Classification and Properties)	Plants (basic structure of flowering plants)	Animals including humans (basic needs)	Seasonal Changes
Vocabulary	Properties, Material Hard, soft, Shiny, Dull, rough, Object, Opaque Transparent, Absorbent	organism, wild plant, evergreen, deciduous, flowering plant, tree, trunk, branches, leaves, blossom, fruit, stem, roots	offspring, adults, life-cycle, survival, energy, cells, oxygen, exercise, hygiene, diseases, nutrition.	Winter, Spring, Summer, Autumn, weather, temperature, hot, cold, rainfall, flood

Cycle B- 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)
Plants (basic structure of flowering plants)	Plants are a living organism – wild plants grow without human intervention and garden plants grow in a garden with human intervention 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
Everyday materials (Classification and Properties)	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 everyday materials - transparent – allows light through, rigid – not flexible, absorbent – able to soak up liquid easily
Animals including humans (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

	Everyday materials (Classification and Properties)	Plants (basic structure of flowering plants)	Animals including humans (basic needs)	Seasonal Changes
Key Scientists	**Charles Mackintosh** – chemist and inventor **Jon Dunlop** – inventor	**Beatrix Potter** – botanist and natural scientist **John Ray** – naturalist	**Jane Goodall** – primatologist **Joan Beauchamp Procter** – Zoologist **Maria Sibylla Merian** – Scientific illustrator and entomologist **Louis Pasteur** – biologist and chemist	**George James Symons** - meteorologist
Linked Texts	**Rosie Revere, Engineer** – Andrea Beaty & David Robert	**A little guide to wild flowers** – Charlotte Voake	**Tadpole's Promise** – Jeanne Wills & Tony Ross	**Out and About: A First Book of Poems** – Shirley Hughes

Experiences	SMSC	British Values	The Meadows Values
Growing plants from seeds and bulbs	Moral – it is our planet and we should look after it Spiritual – sense of enjoyment and fascination of growing things	Respect – the children are taught about some differences between the plants that we grow in Britain and in other countries Individual liberty - children are encouraged to grow a plant of their choice	Team Work is taught when the children are working as part of a team. Respect: Respecting nature and the world Respect– the environment around you Team Work: Working as a team during experiments

Biology	Chemistry	Physics
Animals, including humans (basic needs) **Plants** (basic structure of flowering plants)	**Everyday materials (Classification and Properties)**	**Seasonal Changes** *(changes and weather)*

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 a shadow changes **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** To 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 plan 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	**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 Make predictions for new values, suggest improvements & raise further questions

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	Identifying differences, similarities or changes related to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings.

Strand	**Forces and Magnets**	**Rocks**	**Plants**	**Animals including humans**	**Light**
Vocabulary	magnetic, non-magnetic, iron, steel (an alloy of iron), nickel, bar magnet, North pole, South pole, opposite, like poles, non-contact, magnetic force, bar, horseshoe, repel, attract, push, pull, contact force	sedimentary, metamorphic, igneous, hard, soft, permeable, impermeable, durability, organic matter, clay, sandy, loamy, peaty, chalky, silty	roots, nutrition, absorbs, stem/trunk, transport, leaves, flowers, minerals, photosynthesis, dispersal, reproduce, pollination, germination, fertilised	nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles	natural, artificial, reflective, protection, shadow, blocked, light source, opaque, transparent, translucent, source, UV light, damage, retina, shiny, smooth, flat

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 reflected 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 source 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	The flower is needed for reproduction. The leaves are needed for nutrition (leaves use sunlight to change carbon dioxide and water into food – photosynthesis) The stem holds the plant up towards the light and carries water and minerals from the roots to the rest of the plant. The roots anchor the plant and root hairs absorb water and minerals from the soil. Water travels up a plant after being absorbed from the soil. Each flowering plant has a male (stamen) and female (carpel) part. A stamen contains pollen grains. A carpel contains the eggs. Flowers are pollinated by insects or wind. When pollen and egg join, a seed is made Seeds are dispersed by wind, water, animals or by explosion.

Forces and magnets	A force is a push or pull. A force can make things slow down or speed up. When an object moves on a surface, the texture of the surface and the object affect how it moves. Moving objects slow down quickly on rough surfaces. Moving object don't slow down much on smooth surfaces. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Magnets don't need to touch objects for a force to occur. A magnet has a North pole (N) and a South pole (S). A North and South pole attract, like poles repel. Only some materials are attracted to magnets (steel and iron).

	Forces and Magnets	**Rocks**	**Plants**	**Animals including humans**	**Light**
Key Scientists	**John McAdam** – civil engineer and road builder **Isaac Newton** – physicist **Leonardo Da Vinci –** scientist and painter	**Mary Anning** – palaeontologist **Florence Bascom** – geologist	**Stephen Hales** – botanist **Agnes Arber** - anatomy of plants	**Wilhelm Rontgen** – mechanical engineer and physicist (x-rays) **Ibn Sina Avicenna** – physician	**Ibn Al-Haytham Allhazen** – inventor **Lewis Latimer** - inventor
Linked Texts	**The Lost Thing** – Shaun Tan	**A rock is lively** – Dianna Hutts Aston & Sylvia Lively	**Plantopedia: Welcome to the Greatest Show on Earth** – Adrienne Barman	**Can I build another me?** – Shinsuke Yoshitake	**You are light** – Aaron Becker

Experiences	**SMSC**	**British Values**	**The Meadows Values**
Local walk looking at uses of rocks Observing changes in a growing plant	Cultural – British scientist Isaac Newton proven light theory that light is made up of coloured particles Moral – to be aware of the negative effects of humans on the planet	Democracy – turn-taking and collaboration when creating shadows	Resilience – keep going when your experiments don't work the first time Respect– the environment around you Team Work: Working as a team during experiments

Biology	Chemistry	Physics
Plants Animals, including humans	Rocks/	Light Forces and magnets

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 Classification of Living Things

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

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

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	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 topic

Strand	**Classification of living things**	**Sound**	**States of Matter**	**Animals including humans**	**Electricity**
Vocabulary	invertebrates, vertebrates, classification, mammal, fish, bird, reptile, amphibian, global warming, litter, oil spill, chemical pollution, deforestation and land development	vibration, sound wave, source, volume, amplitude, pitch, ear, soundproof, absorb, absorbent materials, eardrum, distance	boiling point, boiling, condensing evaporation, freezing freezing point, gas liquid, solid, matter, material, melting	digestive system, salivary glands, oesophagus, stomach, pancreas, enzymes, liver, gall bladder, small intestine, large intestine, rectum, incisors, canines, molars, consumers, prey, predators	appliances, circuit, cells, wires, bulbs, switches, buzzers, conductor, insulator,

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 eat 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)
Classification of Living Things	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

Our Mission: To drive personal and academic excellence; everyone, every day.

	Classification of Living Things	Sound	States of Matter	Animals including humans	Electricity
Key Scientists	**Rachel Carson** – marine biologist and conservationist **Jacques Cousteau** – ocean explorer and conservationist	**James West** – inventor and acoustician **Alexander Graham Bell** – inventor and engineer	**Daniel Gabriel Fahrenheit** – physicist **Antoine Lavoisier** – chemist	**Marie M. Daly** – biochemist **Pierre Fauchard** – physician	**Hertha Ayrton** – engineer, physicist and inventor **Joseph Swan** – physicist, chemist and inventor
Linked Texts	**Botanicum (Welcome to the museum)** – Kathy Willis & Katie Scott	**Sonam and the Silence** – Eddie Ayres & Ronak Taher	**Water dance** – Thomas Locker	**Gut Garden: A Journey into the Wonderful World of Your Microbiome** – Katie Brosnan	**When Charlie McButton Lost Power** – Suzanne Collins & Mike Lester

Experiences	SMSC	British Values	The Meadows Values
Local walk looking at uses of rocks Observing changes in a growing plant	Moral – making the right choices to aid a healthy digestive system and eating the right nutrients for the body to function at its best	Individual liberty – to create a circuit made up of components of their choosing Democracy – turn-taking and collaboration when creating circuits, shadows and sounds	Resilience – keep going when your experiments don't work the first time Respect– the environment around you Team Work: Working as a team during experiments

Biology	Chemistry	Physics
Classification of Living Things *(grouping and simple classifying/changes to habitats can pose dangers)* **Animals, including humans** *(teeth, eating and digestions)*	**States of matter** *(solids, liquids, gases, heating & cooling, water cycle)*	**Sound** *(fainter sounds further away, vibrations, pitch and volume)* **Electricity** *(simple circuit, switches, conductors and insulators)*

Core Values: Resilience, Respect, Team Work, Aspiration, Kindness, Curiosity
Golden Threads of our Curriculum: R-A-I-S-E

Year 5: Science skills progression

POS	Working scientifically:
Year 5 Animals including humans Describe the changes as humans develop to old age **Year 5 Forces and Movement** 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** 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	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.

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	Use books from the library service linked to Science topics

Strand	**Living things**	**Forces and Movement**	**Properties and changes of materials**	**Animals including humans**	**Earth and space**
Vocabulary	birth, growth, reproduction and death, life-cycle, mammal, amphibian, reptile, mammal, insect, bird, larva, pupa	unopposed, motion, gravity, air resistance, water resistance, lever, pivot, fixed, pulley, force, gear, mechanism, friction	particles, state, matter, melt, temperature, condensation, evaporation, water vapour, precipitation, solution, sieving, filtering, reversible, irreversible	Life-cycle, development, puberty, physical changes, ovaries, pubic hair. Menstrual cycle	axis, orbit, tilt, planets, solar system, spherical body, rotation, dwarf planet, time zone, circular, gravity

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. During adulthood our 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. There is also an 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 start to grow.
Forces and Movement	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	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 is used as 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

	Living things	Forces and Movement	Properties and changes of materials	Animals including humans	Earth and space
Key Scientists	**Mary Agnes Chase** – botanist **David Attenborough** – broadcaster and natural historian	**Albert Einstein** – theoretical physicist **Archimedes** – mathematician, engineer and inventor	**Spencer Silver** – chemist and inventor **Arthur Fry** – chemist and inventor	**Elizabeth Blackwell** – doctor **Patrick Steptoe** – obstetrician **Robert Edward**- physiologist **Jean Purdy** – embryologist	**Galileo Galilei** – Astronomer, physicist and engineer **Mae Jemison** - astronaut
Linked Texts	**Where the world turns Wild** – Nicola Penfold	**The Explorer** – Katherine Rundell	**The Story of Inventions** – Anna Claybourne & David Roberts	**Nine Months** – Miranda Paul	**Once Upon a Star: The Story of Our Sun –** James Carter & Mar Hernandez

Experiences	SMSC	British Values	The Meadows Values
Keele Observatory – Space	Social – working with other pupils when completing experiments Culture – understanding the importance of Isaac Newton's role in developing the principles of modern physics	Mutual respect and tolerance – through listening to others opinions when working with materials	Resilience – keep going when your experiments don't work the first time Respect– the environment around you Team Work: Working as a team during experiments

Biology	Chemistry	Physics
Living things and their habitats *(life cycles, reproduction)* **Animals, including humans** *(changes in humans as they grow)*	**Properties and changes of materials** *(more properties including thermal and electrical conductivity, mixing and separating reversible and irreversible)*	**Forces and Movement** *(gravity, friction, air resistance, levers, pulleys and gears)* **Earth and Space** *(other planets)*

Year 6: Science skills progression	
POS **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: Further Classification** 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 and seeing things** 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:** 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

Strand	**Living things: Further Classification**	**Electricity**	**Evolution and Inheritance**	**Animals including humans**	**Light and seeing things**
Vocabulary	micro-organisms, vertebrates, invertebrates, mammal, reptile, amphibian, insects, spiders, worms, snails, Carl Linnaeus, fungi, monera bacteria, protocista	voltage, electrical energy, current, electrons, cells, parallel circuit, resistor	characteristics, natural selection, mutations, inheritance, offspring, fossils, adaptation, evolution, generation	nutrients, capillaries, arteries, veins, oxygenated blood, deoxygenated blood, circulatory system, tissues, heart, lifestyle, diet, exercise	refraction, light source, shadows, reflection, visible, spectrum, transparent, translucent, opaque

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: Further Classification	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. A camel has humps of fat storage to use up for energy in the dry desert when there is a shortage of food, A 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 and seeing things	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

	Living things: Further Classification	**Electricity**	**Evolution and Inheritance**	**Animals including humans**	**Light and seeing things**
Key Scientists	**Carl Linnaeus** – botanist and zoologist **Marjory Stoneman Douglas** – writer and conservationist	**Michael Faraday** – physicist **William Kamkwamba** – inventor	**Charles Darwin** – naturalist **Gregor Mendel** – botanist and biologist **Marie Curie** – physicist and chemist	**Alexander Fleming** – physician and microbiologist **Lemuel Diggs** - pathologist	**Thomas Edison** – inventor **Hertha Ayrton** – engineer, mathematician and inventor.
Linked texts	**Tiny: The Invisible World of Microbes** – Nicola Davies	**Cool Circuits and Wicked Wires** – Susan Martineau	**Story of Life: Evolution** – Katie Scott	**Knowledge Encyclopaedia: Human Body!** - DK	**Edison: The Mystery of the Missing Mouse Treasure** – Torben Kuhlmann

Experiences	**SMSC**	**British Values**	**The Meadows Values**
Heart surgeon	Social – working with other pupils when completing experiments Culture – understanding the importance of Carl Linnaeus's role in developing the classification system	Mutual respect and tolerance – through listening to others opinions when working with materials	Resilience – keep going when your experiments don't work the first time Respect– the environment around you Team Work: Working as a team during experiments

Biology	**Chemistry**	**Physics**
Animals, including humans *(circulatory system, functions of heart, blood vessels and blood, health, water transport in animals)* **Living Things: Further Classification***(classifying including micro-organisms)* **Evolution and inheritance** *(more about fossils, adaptation)*		**Light and seeing things** (travels in straight lines, how we see things) **Electricity** (what affects bulb brightness, buzzer volume, voltage, symbols)