Evelyn Street Primary School

SCIENCE

Our Intended Curriculum

Science

Our school supports a diverse community that has a large proportion of social and economically challenged circumstances.

(Version 5, June 23)

In response to this, our science curriculum is aspirational, exploring the world of work through focusing on pioneering scientists.

We are aware that obesity is on the rise and that in our school, historically, our reception and year 6 children's weights are above Warrington and Local Authority averages, so we ensure healthy lifestyles, diet and mental health are a focus. This curriculum aims to deliver academic success and global citizenship.

Our planning of the science curriculum develops disciplinary and substantive knowledge and is underpinned by scientific laws and theories.

Disciplinary Knowledge

- **Fair & comparative testing** - Comparative and fair test enquiries enable children to explore relationships between different variables. In simple comparative tests children compare one event with another and identify different outcomes. For example, does the red car go faster than the green car?
- **Identifying, classifying & grouping -** Classification makes identification easier and is based on grouping things by looking at similar observable characteristics.
- **Pattern Seeking** - Pattern-seeking enquiries involve children making measurements or observations to explore situations where there are variables that they cannot easily control. In this type of enquiry, children are trying to answer 'big questions' by identifying patterns in the measurements and observations they record.
- **Observing over time -** Pupils identify and measure events and changes in living things, materials and physical process or events. These observations may take place over time spans of minutes or hours (e.g., puddles evaporating) up to several weeks or months (e.g., rearing young chicks).

Research using secondary sources - Common *secondary research* methods include *data* collection *through* the internet, libraries, archives, schools, and organisational reports

Substantive Knowledge

- **Matter -** The term matter refers to anything that occupies space and has mass—in other words, matter has volume and mass. All matter is made up of substances called elements, which have specific chemical and physical properties.
- **Ecology -** the study of the environment helping us understand how organisms live with each other in unique physical environments.
- **Organisation of organisms -** An organism is made up of four levels of organization: cells, tissues, organs, and organ systems
- **Earth and Space -** Earth and space science is about Earth and its place within the solar system and universe.
- **Light and Sound (waves)** - Light is defined as the electromagnetic radiation with wavelengths between 380 and 750 nm which is visible to the human eye. Sound is vibrations that travel through the air or another medium and can be heard when they reach a person's or animal's ear.
- **Reproduction and Genetics -** Reproduction is the biological process by which new individual organisms – "offspring" – are produced from their "parent" or parents and is a fundamental feature of all known life; each individual organism exists as the result of reproduction. Genetics is the scientific study of genes and heredity—of how certain qualities or traits are passed from parents to offspring because of changes in DNA sequence.
- **Forces and motion -** A force is a push or pull that acts on an object due to the interaction with another object. All forces between objects are either: contact forces – the objects are physically touching. Non-contact forces – the objects are physically separated. Motion is the change of position of an object with respect to time. We live in a universe that is in continual motion.
- **Electricity and magnetism -** two related phenomena produced by the electromagnetic force. Electricity is the presence or flow of charged particles. Magnetism is produced by the motion of electric charge, which results in attractive and repulsive forces between objects. Together, they form electromagnetism.
- **Classification and evolution -** Classification is the arrangement of animals and plants in groups according to their observed similarities and evolution is the process by which different kinds of living organism are believed to have developed from earlier forms during the history of the earth.
- **Working Scientifically** - The processes of science**:** asking questions, designing experiments, reasoning, and arguing with scientific evidence

Laws and theories

Physics:

Newton's light theory – light is composed of coloured particles that combine to appear white

Sound theory – sound is a result of a vibration which is produced by a source and then it travels in a medium as a wave and is sensed in the eardrum. Sound is a form of energy.

Newton's Universal law of Gravitation - any two objects, no matter their mass, exert gravitational force toward one another

Newton's first law of motion states an object in motion stays in motion unless acted upon by an outside force

The Law of Reflection states that the angle of the incident light ray is equal to the angle of the reflected light ray

Hubble's Law of Cosmic Expansion - established that the universe is made up of many galaxies

Kepler's Law of planetary motion -that planets orbit the sun elliptically

Chemistry:

Atomic theory - that matter is composed of particles called atoms

Biology: Cell theory - cells are the basic structural, functional, and organizational units of both single-celled and multicellular organisms

Photosynthesis is a process by which plants, algae and some types of bacteria convert light energy into chemical energy

Darwin's theory – Natural Selection

Evelyn Street Primary School - SCIENCE progression through EYFS (Early Years Foundation Stage)
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 the weather and the animals they see or hear, using a wide vocabulary • Recognise the change through seasons of our outdoor environment	• 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 touch, sight and hearing 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 • Observe the key features of the life cycle of a butterfly • know some animals have offspring horse – foal, cow - calf	Senses, experiment, plants – leaf, stem, root, flower, animals, humans, materials, change, growth, environment, heavy, light, float, sink, baby, toddler, child, egg, caterpillar, seasons, melt, freeze, hard, soft, kitten, puppy, foal, calf etc

Nursery Knowledge	**Autumn** **All about me/ Celebrations**	**Spring** Traditional Tales/ Growth and Change	**Summer** People Who Help Us/ Chester Zoo/Knowsley Safari
	• Name & identify body parts- facials features, arms, legs, fingers, and toes • Know the names of different body parts & what they do •Know about the different seasons & the effect they have on plants, tress &creatures •Using images can sequence the change from baby to child •Use all their senses in hands-on exploration of natural materials	• Know the names of animal babies • Observe that most plants start growing from a seed or bulb • Observe 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 some different properties of material e.g. hard/soft and rough/smooth • Know some objects float & sink

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 chickens and egg laying and caring for our own caterpillars/butterflies. Experience of Forest School.

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Trip to farm and zoo Resident chickens 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	Responsibility is taught through looking after the chickens and caring for the class's caterpillars/butterflies. Humility - by letting others collect the eggs first and by asking for help or accepting other children's help

Evelyn Street Primary School - UTW- The Natural World
Science progression through EYFS

Educational Programme: Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting key members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

ELG - Understanding the World- The Natural World

■ 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, Knowledge & Understanding	▪ 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 ▪ Observe & interact with natural processes, such as looking at the effect of heat/cold with melting ice, freezing water, toast	▪ 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 regarding 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 that exercise is good for 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, water, waterproof, natural, change, growth, hot, cold, environment, heavy, light, float, sink, stretch, snap, magnetic, life cycle, baby, toddler, child, egg, chick, caterpillar, chrysalis, bark, stick, branch, seasons, melt, freeze, hard, soft, kitten, puppy, foal, calf, rough, smooth, shiny, dull, oaks, maples, beeches, seasonal, changes,

Learning Outcomes	Autumn 1 My Environment & Me	Autumn 2 Special Times & Special Places	Spring 1 Same and Different	Spring 2 Lifecycles	Summer 1 In My Garden	Summer 2 People in the Community
	Explore the changes to animals and plants in Autumn – leaves, trees, insects, animals, nocturnal animals. Talk about weather changes in the seasons.		Explore the effects weather has on living things in Winter and Spring – leaves, trees, plants, insects, animals. Compare some similarities and differences between the seasons.		Explore the effects weather has on living things in Summer – leaves, trees, grass, plants, insects, animals. Talk about similarities and differences between each season.	

	Talk about hedgehogs, birds, tortoise, fish and frogs and their habitats in Autumn and Winter – hibernation. (Hedgehogs, tortoise) fish and frogs move down to the bottom of lakes and ponds and some even burrow into the mud. Name the properties of some materials such as – hard and soft, rough and smooth and shiny and dull. Describe the most suitable materials for building and give explanations as to why. Manipulate some materials such as Play-Dough and describe how they change – squash, stretch, bend, twist. Look at a range of materials in the environment and describe how they feel. Understand how to reduce the spread of germs – hand washing, cleaning. Understand how to look after ourselves – tooth brushing, healthy eating such as fruit and vegetables. Name some of a human's body parts – legs, arms, head, knees, elbow. Identify some parts of the body and locate them on a map of themselves. Talk about some animal's habitats in our immediate environment – where do the insects, chickens, foxes and hedgehogs live? Understand that familiar places can be habitats - Sankey Brook, the outdoor area, bug hotels. Explore our forest school and understand that it is a habitat for living things e.g. bats and badgers	Compare the effects heating and cooling has on ingredients such as melting and freezing. Talk about animals in their habitats in Spring - comparing this to Autumn and Winter. Understand that plants need space, water, light and air to grow. Use correct terms when observing the life cycle of butterflies and ladybirds Observe and talk about the life cycle of a chicken using the correct terminology Use language related to the life cycle of a chicken to explain the process – brooding, incubation, clutch of eggs. Explore the life cycle of humans and begin to compare this with the life cycle of a chicken. Talk about routines in the morning and the evening and use language related to day and night. Begin to talk about an animal's offspring – hen and chick, sealion and a pup, whale and a calf. Use language relating to planting and plant sunflowers and bulbs in the outdoor area – seeds, plants, bulbs.'	Classify a set of objects by their materials - wood, plastic, fabric, sand and glass – Recyling. Know the foods different animals might eat and how they find their food – whales hunt for krill. Compare similarities and differences between animals' habitats – insects. Talk about and compare how habitats change for animals during the Summer. Understand and explain the life cycle of a plant. Talk about some trees that are deciduous – oaks, maples, and beeches. Observe and talk about the life cycle of butterflies and compare this with the life cycle of chicken's and humans.
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. Forest School sessions will further enhance this experience □Visits from the farm will be used to enhance children experiences of animals and first-hand experiences of watching our own caterpillar's/butterfly's life cycle (net).			

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Resident chickens in the outdoor area Access to school allotment Trip to a farm Trip to Knowsley Safari Park Forest school	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	Responsibility is taught through looking after the chickens and caring for the class's caterpillars/butterflies. Humility - by letting others collect the eggs first and by asking for help or accepting other children's help

KS1 Science Year A	
POS **Animals including humans (classification of animals)** • 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 **Animals including humans (animal 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 diverse types of food, and hygiene **Living things and their habitats (what is a living thing? Habitats in local environment)** • 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 various 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 various sources of food	**Working scientifically**: **Fair & comparative testing** When appropriate, measure using standard units where all the numbers are marked on the scale Record data in simple prepared tables, pictorially or by taking photographs Identify the question to investigate from a scenario or choose a question from a range provided **Research using secondary sources** Ask one or two simple questions linked to a topic How does a cactus survive in a desert with no water? What do you need to do to look after a pet dog/cat/lizard and keep it healthy? **Identifying, classifying & grouping** Be able to ask a Yes/No questions to aid sorting Identify the headings for the two groups (it is …., it is not ….) Be able to compare on obvious, observable features e.g. size, shape, colour, texture etc. Which offspring belongs to which animal? How would you group things to show which are living, dead, or have never been alive? **Pattern seeking** Ask a question that is looking for a pattern based on observations Record data in simple, prepared tables and tally charts What conditions do woodlice prefer to live in? Which habitat do worms prefer – where can we find the most worms? **Observing over time** Ask a question about what might happen in the future based on an observation How does a tadpole change over time? **Interpreting results** Talk about the number of objects in each group i.e. which has more or less Be able to answer their questions using simple sentences using their observations or measurements

KS1 Year A – End Points	
Animals including humans Classification of animals	• Know the animal kingdom is classified into fish, amphibians, reptiles, birds, and mammals • Know a carnivore feeds on other animals, examples are fox, shark, crocodile, frog, owl • Know an herbivore feeds on plants, examples are cows, pigeon, tortoise, parrotfish • Know an omnivore feeds on both animals and plants, examples are lizards, bears, yellow-legged frog, crow, goldfish • Know five of the senses are associated with the following: hands-touch; nose-smell; mouth-taste; eyes-see and ears-hear • Name examples of fish: trout, salmon, cod, plaice • Name examples of amphibians: frog, newt, toad • Name examples of reptiles: lizard, snake, turtle, alligator • Name examples of birds: sparrow, blackbird, robin, chicken • Name examples of mammals: humans, dog, rat, bear • Know animals can be warm or cold blooded
Animals including humans Animals' basic needs	• Know all animals, need food, water, air, and shelter • Know animals, need to stay fit by eating sensibly and taking regular exercise • Know all animals, need to eat a balanced diet • Know the food groups are carbohydrates, proteins, fats, fruits and vegetables and dairy • Know all animals, have offspring which then grow into adults • Know some offspring are different from their adults e.g., caterpillar-butterfly, tadpole-frog • Know the four stages in a life are: birth, growth, reproduce and death • Know animals also need exercise and sleep to keep a body healthy • Know humans are hygienic to stop the spread of germs
Living things and their habitats	• Know the difference between living (grow), dead (no longer alive) and never been alive (does not grow) • Know the 5 things all living things need – food, water, shelter, warmth, and space • 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)

	• Know 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) • Know animals obtain food from other animals and plants • Know how to explain a simple food chain and name various sources of food (grass, snail, bird)
Energy	• Know examples of common appliances that run on mains electricity are television, fridge/freezer, microwave, washing machine, lights • Know that everyday appliances use electricity; these include things that light up, heat up, produce sounds and move • Know examples of objects that use batteries are torches, mobile phones, calculators • Know a force is a push or a pull • Know that pushing or pulling things can make objects start or stop moving • Know that sometimes pushes and pulls change the shape of objects • Know that there are many different sources of sounds • Know how to make observations of sounds by listening carefully • Know that light sources give out light and the sun is a light source • Know that light is essential for seeing things • Know that sources of light show up best at night-time

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Ignite Project – Chester Zoo Zoolab workshop	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	Honesty – through discussion be honest about the amount of exercise they do Responsibility – we are responsible for the living things within our school and local environment

KS1 Science Year B	
POS **Seasonal changes** •observe changes across the 4 seasons •observe and describe weather associated with the seasons and how day length varies **Everyday materials (classification of everyday materials and their 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 based on their simple physical properties **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 **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 **Plants (how seeds and bulbs grow, and a plant's needs)** 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	**Working scientifically:** **Fair & comparative testing** When appropriate, measure using standard units where all the numbers are marked on the scale Record data in simple prepared tables, pictorially or by taking photographs Identify the question to investigate from a scenario or choose a question from a range provided Which is the best material suitable for a particular purpose? Do bigger seeds grow into bigger plants? **Research using secondary sources** Ask one or two simple questions linked to a topic What are the most common British plants and where can we find them? How have the materials we use changed over time? **Identifying, classifying & grouping** Be able to ask a Yes/No questions to aid sorting Identify the headings for the two groups (it is …., it is not ….) Be able to compare on obvious, observable features e.g. size, shape, colour, texture etc. We need to choose a material to make an umbrella. Which materials are waterproof? Which materials will float and which will sink? **Pattern seeking** Ask a question that is looking for a pattern based on observations Record data in simple, prepared tables and tally charts Is there a pattern in the types of materials that are used to make objects in a school? **Observing over time** Ask a question about what might happen in the future based on an observation **Interpreting results** Talk about the number of objects in each group i.e. which has more or less Be able to answer their questions using simple sentences using their observations or measurements

KS1 Year B – End Points	
Seasonal Changes	• Know the sun provides earth with warmth and light • Know in Autumn the leaves of many trees change colour, the temperature grows colder, plants stop making food and animals prepare for the months ahead • Know in Winter, it is usually the coldest time of the year and in some places, it brings freezing temperatures, snow, and ice • Know in Spring dormant plants, begin to grow again, new seedlings sprout out of the ground, plants grow new leaves and hibernating animals awake • Know in summer that it has long, usually sunny days and is the hottest season • Know that the movement of Earth in space gives us day and night • Know it takes the Earth a day to go around on its axis • Know that in the UK (United Kingdom), the day length is longest in the summer and shortest in the winter • Know that the moon goes around the Earth
Everyday Materials	• know objects are things we can see or touch and can be made from one or more materials • know a material is the matter from which a thing is or can be made from • know a natural material is any product that comes from plants, animals, or the ground • know examples of natural materials are water, wood, rock, cotton, iron, oil, leather • know manufactured materials are materials that have been produced by man • know examples of manufactured materials are plastic, metal, glass, brick, paper, fabric, foil • Know that everything is made up of materials • Know materials can be grouped according to their properties • Know varied materials, have different properties • Name different properties: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent
Use of Everyday Materials	• Know that materials are picked for a specific purpose because of their properties • Know glass is made by melting sand and other minerals together at extremely hot temperatures. It is normally transparent and can be made into different shapes. Thick glass can be strong, but thin glass breaks easily • Know different fabrics, have different properties. They can be stretchy (a pair of tights), insulating (a woollen coat) or absorbent (a towel)

	• Know pans made from metal are strong, hard, and shiny materials that can be hammered into different shapes without breaking. They are good conductors of heat and electricity • Know plastics are materials made from chemicals. They are strong and waterproof, can be made into any shape by applying heat, are good insulators and do not conduct heat or electricity • Know furniture made from wood comes from trees. It is strong, flexible, and long-lasting and an insulator of heat and electricity • Know fabrics are used to make clothes as they are flexible, warm and do not wear out easily • Know the same object can be made using varied materials e.g., spoons can be made from wood, metal, plastic • Know some shapes of objects can be changed by squashing, bending, twisting, or stretching
Plants – Basic Structure	• Know flowering plants, consist of leaves, flowers (blossom), petal, roots, bulb or seed, trunk, or stem • Know wild plants, grow without human intervention, and garden plants are grown by human intervention • Know the wildflowers – dandelion, forget-me-not, thistles, daisy, poppy • Know the garden flowers – rose, fuchsia, geranium • Name deciduous trees – ash, oak, beech, silver birch, alder • Know deciduous trees shed their leaves in winter to conserve energy • Know evergreen trees, keep their leaves throughout the year • Name evergreen trees pine, spruce, cedar
Plants – how plants and seeds grow and a plant's needs	• Know seeds and bulbs have a store of food inside them • Know plants, need light, water, air, nutrients, and space • Know that seeds and bulbs do not need light to germinate but need warmth. • Know the process to grow into mature plants includes growing roots, shoot appears through soil, plant takes nutrients from the soil and continues to grow • Know types of seed: sunflower apple, tomato, pea • Know types of bulbs: daffodil, tulip, bluebells, onions, garlic • Know that plants need water, light, warmth, and space to stay healthy

Experiences	**SMSC**	**British Values**	**WPAT/School Values**

Use of school allotment Growing plants from seeds and bulbs Gardening club Exploring the local environment for changes through the seasons	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	Responsibility – the children look after the plants within the school ground and wooded area

LSK2 Science Year A	
POS **Rocks** •compare and group together various kinds of rocks based on their appearance and simple physical properties •describe in simple terms how fossils are formed when things that have lived are trapped within rock •recognise that soils are made from rocks and organic matter **Light** •recognise that they need light 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 **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 **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 **Animals including humans (nutrition, skeleton, and muscles)** •identify that an animal, 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	**Working scientifically**: **Fair & comparative testing** Decide what to change and what to measure or observe Take repeat readings where necessary Prepare own tables to record data Present data in bar charts How does the length of a guitar string/tuning fork affect the pitch of the sound? How does the thickness of a conducting material affect how bright the lamp is? **Research using secondary sources** Choose a source from a range provided Present what they learnt verbally or using labelled diagrams How has electricity changed the way we live? Why are people cutting down the rainforests and what effect does that have? **Identifying, classifying & grouping** Sort objects and living things into groups using intersecting Venn and Carroll Diagrams Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs Suggest improvement and new questions arising from the investigation.? How do the skeletons of different animals compare? How would you organise these light sources into natural and artificial sources? **Pattern seeking** Decide what to measure or observe Measure using standard units where not all the numbers are marked on the scale. Use ICT package to present data as a scattergram Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school? **Observation over time** Present data in time graphs Decide how often to take a measurement. Use dataloggers to measure over time How does tumbling change a rock over time? **Interpreting results** Refer directly to their evidence when answering their question Where appropriate provide oral or written explanations for their findings

	Use results from an investigation to make a prediction about a further result

Laws/theories

Physics: Quantum theory – light consists of tiny particles which have wavelike properties associated with them. Light is composed of particles called photons.
Newton's light theory – light is composed of coloured particles that combine to appear white
Sound theory – sound is a result of a vibration which is produced by a source and then it travels in a medium as a wave and is sensed in the eardrum. Sound is a form of energy.

LSK2 Year A – End Points	
Rocks	• Know there are three main types of rocks and give an example – sedimentary (chalk, limestone, shale, sandstone), metamorphic (slate, marble, quartzite, anthracite) and igneous (basalt, granite, pumice, obsidian) • Know that rocks can be group based on physical properties and can give examples – hard/soft, permeable/impermeable or durability • Know that fossils are formed by 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. • Know that soil is made from rocks and organic matter – clay, sandy, loamy, peaty, chalky, silty • Know that soil can help plants grow
Light	• Know that light is a form of energy • Know that the eyes take in light so we can see • Know that you cannot see anything when there is no light • Know light sources give out light • Know natural light sources are sun, stars, candle flame, fire • Know artificial light sources are light bulbs, florescent lighting, computer screens • Know some objects seem bright but are reflecting light from elsewhere, for example the Moon, mirrors, and shiny objects • Know that light from the Sun is strong and can damage your eyes • Know the eyes can be protected by wearing dark glasses • Know to never look directly at the sun • Know that light can pass through materials that are transparent like glass • Know that some light passes through materials that are translucent like frosted glass • Know that light cannot pass through opaque materials • Know that when light is blocked by an opaque object, a shadow is formed • Know that the size of the shadow changes depending on the position of the light source • Know that the closer the light source to the object the larger the shadow will be

Sound	• Know that sounds are made by continuous vibrations and the vibrations sends waves into the ear • Know that sound can travel through varied materials and give examples – solid (metal, stone wood), liquid (water) and gas (air) • Know that the louder the sound (the stronger the vibrations) and sounds become fainter as the distance increases • Know that high pitch means fast vibrations and low pitch is slower vibrations
Animals including humans (Nutrition, skeleton, and muscles)	• Know the right food is important for a healthy body • Know animals, get their nutrients from what they eat • Know all animals, need the right amount of nutrients from the food they eat • Know carbohydrates and fats provide energy, proteins help with growth and repair, vitamins and minerals keep cells healthy, fibre helps food move through the gut and 70% of the body is water • Know the skeleton does three jobs: protecting the body parts, supporting the body, and letting the body move. • Know bones, have joints so the skeleton can bend. • Know muscles and joints allow movement • Know muscles are soft tissues that are joined to bones and always work in pairs.
Living things and their habitats	• Know examples of how living things can be grouped – invertebrates (no backbone) vertebrates (have a backbone) and plants can be classified into flowering and non-flowering plants • Know how to 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… - • Know how to identify invertebrates (annelids, sponges, echinoderms, insects, molluscs, crustaceans, arachnids) and vertebrates (amphibians, birds, fish, mammals, and reptiles) • Know how environments can change and how it can potentially pose a danger to living things -global warming, litter, oil spill, chemical pollution, deforestation, and land development • Know environments can change and have a positive effect – nature reserves, parks and gardens, community gardens and ponds

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Rock workshop – Warrington Museum Local walk looking at uses of rocks	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 Social – we discuss the different uses of electricity	Individual liberty – to create a circuit made up of components of their choosing Democracy – turn-taking and collaboration when creating circuits, shadows, and sounds	Humility – working as a team when creating circuits, shadow experiments Resilience – keep going when your circuit does not work first time

LSK2 Science Year B	
POS **Plants** •identify and describe the functions of various 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 **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 based on 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 **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 **Animals including humans (digestive system, teeth, and food chains)** •describe the simple functions of the basic parts of the digestive system in humans •identify the diverse types of teeth in humans and their simple functions •construct and interpret a variety of food chains, identifying producers, predators, and prey **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 a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery	**Working scientifically:** **Fair & comparative testing** Decide what to change and what to measure or observe Take repeat readings where necessary Prepare own tables to record data Present data in bar charts How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? How does the mass of an object affect how much force is needed to make it move? **Research using secondary sources** Choose a source from a range provided Present what they learnt verbally or using labelled diagrams What are all the different ways that seeds disperse? Why do different types of vitamins keep us healthy and which foods can we find them in? **Identifying, classifying & grouping** Sort objects and living things into groups using intersecting Venn and Carroll Diagrams Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs Suggest improvement and new questions arising from the investigation. How can we organise teeth into groups? Can you group these materials and objects into solids, liquids, and gases? **Pattern seeking** Decide what to measure or observe Measure using standard units where not all the numbers are marked on the scale. Use ICT package to present data as a scattergram Does the size and shape of a magnet affect how strong it is? Is there a pattern in how long it takes different sized ice lollies to melt? **Observation over time** Present data in time graphs Decide how often to take a measurement. Use dataloggers to measure over time. If we magnetise a pin, how long does it stay magnetised for? How does the mass of an ice cube change over time?

•recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit •recognise some common conductors and insulators, and associate metals with being good conductors	**Interpreting results** Refer directly to their evidence when answering their question Where appropriate provide oral or written explanations for their findings Use results from an investigation to make a prediction about a further result

Laws/theories

Biology: Photosynthesis is a process by which plants, algae and some types of bacteria convert light energy into chemical energy

Chemistry: Dalton's Law of Partial Pressures states the total pressure by a mixture of gases is equal to the sum of the partial pressures of each of the constituent gases

Atomic theory - that matter is composed of particles called atoms

Physics: Newton's Universal law of Gravitation - any two objects, no matter their mass, exert gravitational force toward one another

Newton's first law of motion states an object in motion stays in motion unless acted upon by an outside force

LKS2 Year B – End Points	
Plants	• Know the flower is needed for reproduction • Know the leaves are needed for nutrition (leaves use sunlight to change carbon dioxide and water into food – photosynthesis) • Know the stem holds the plant up towards the light and carries water and minerals from the roots to the rest of the plant • Know the root anchors the plant and root hairs soak up water and minerals from the soil • Know water travels up a plant after being absorbed from the soil • Know that each flowering plant has a male (stamen) and female (carpel) part • Know the stamen contains pollen grains • Know the carpel contains the eggs • Know flowers are pollinated by insects or wind and pollen carried to stigma of another plant • Know that when pollen and egg join – a seed is made • Know the ovary becomes a fruit which contains the seeds e.g. acorn is the fruit of the oak tree • Know seeds are dispersed by wind, water, animals or by explosion
Forces & Magnets	• Know a force can, make things slow down or speed up. • Know when an object moves on a surface, the texture of the surface and the object affect how it moves. • Know moving objects slow down quickly on rough surfaces. • Know moving objects do not slow down much on smooth surfaces. • Know that for some forces to act, there must be contact e.g., a hand opening a door, the wind pushing the trees

	• Know that magnets do not need to touch objects for a force to occur • Know most magnets have a North pole (N) and a South pole (S) • Know a North and South pole attract and like poles repel • Know monopole magnets only have one pole • Know only some materials are attracted to magnets – steel and iron
States of Matter	• Know that materials can be solids, liquids, or gases (the three states of matter) • Know the shape and volume of a solid does not change unless a bit is broken off • Know the shape of a liquid can change, depending on the container it is in, but its volume does not change • Know that most gases are invisible • Know the gas in a container completely fills the container so has the same shape and volume of the container it is in • Know liquids, change into gases when they are heated – this is evaporation • Know liquids, change into solids when they are cooled – this is freezing • Know gases, change into liquids when they are cooled – this is called condensation • Know solids, change into liquids when they are heated – this is called melting e.g. heating sand at elevated temperatures produces liquid glass • Know the rate of evaporation depends on the temperature • Know evaporation is slow when it is cold and fast when it is hot • Know the water on Earth is constantly recycling using evaporation and condensation • Know the heat from the sun makes the water from the sea, lakes and rivers evaporate into water vapour • Know that as the water vapour rises, it cools and condenses to form clouds, then falls as rain
Animals including humans (Digestive system, teeth, and food chains)	• Know that the digestive system breaks down food. • Know the digestive system consists of mouth, tongue, oesophagus, stomach, small intestine, and large intestine • Know the digestive system of a chicken includes mouth, tongue, oesophagus, stomach, small intestine and large intestine • Know the digestive system of most reptiles and amphibians include mouth, oesophagus, stomach, small intestine and large intestine • Know the digestive system of a salmon includes mouth, teeth, tongue, oesophagus, stomach, intestine • Know that some animals have more than one stomach to aid digestion e.g. alligator, cow • Know teeth are used to chew the food and break it up into bits • Know the tongue helps to chew the food and swallow it • Know that the oesophagus transports food to the stomach • Know that in the stomach the food is churned up and broken down further • Know in the small intestine the nutrients from the food are absorbed into the blood which transports them around the body • Know in the large intestine water is absorbed into the body

	• Know the four front teeth in both the upper and lower jaws are called incisors and are used to cut food. • Know there are four canines in the mouth which tear food and form the corners of the mouth. • Know the premolars are designed to crush and grind food. • Know the molars, have broader and flatter surfaces and grind food. • Know energy passes along the food chain • Know all food chains, start with a plant which is a producer as it makes its own food • Know that animals that eat plants are primary consumers • Know that primary consumers may be eaten by secondary consumers or predators
Electricity	• Know the basic parts of a simple circuit – cells, wires, bulbs, switches, buzzers • Know why a lamp in a simple circuit will (circuit is a complete loop) or will not 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) • Know that conductors easily allow electric to pass through and insulators do not let electricity pass through easily • Know that an example of a good conductor is aluminium, copper, gold, water, people, and good insulators are rubber, plastics, wood, and paper

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Use of school's allotment Science workshop	Moral – making the right choices to aid a healthy digestive system and eating the right nutrients for the body to function at its best Cultural – British physician and scientist Jan Ingenhousz best known for his discovery of photosynthesis	Individual liberty – through discussion listen to others' preferences towards flowering plants Respect – not everyone has a garden where they live	Responsibility – looking after plants that they are growing and the living things within the allotment Honesty – through discussion about who gardens and has space to garden

USK2 Science Year A	
POS **Properties and changes of materials** •compare and group together everyday materials based on 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 **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 **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 **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 **Animals including humans (stages in a human's growth)** •describe the changes as humans develop to old age	**Working scientifically:** Fair & comparative testing Recognise and control variables where necessary Use test results to make predictions for further Investigations Prepare own tables to record data, including columns for taking repeat readings Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface? **Research using secondary sources** Be able to talk about their degree of trust in the sources they used Present what they learnt in a range of ways e.g. different graphic organisers Why do people get grey/white hair when they get older? How have our ideas about the solar system changed over time? **Identifying, classifying & grouping** Be able to answer their question, describing causal relationships Choose an appropriate form of presentation, including line or scatter graphs Measure using standard units using equipment that has scales involving decimals Can you label and name all the forces acting on the objects in each of these situations? **Pattern seeking** Is there a pattern between the size of a planet and the time it takes to travel around the Sun? Choose an appropriate form of presentation, including scatter graphs when looking at rates of dissolving **Observation over time** Be able to answer their questions, describing the change over time How does my shadow change over the day?

Laws/theories

Physics: Fourier's law of thermal conduction states that the time rate of heat transfer through a material is proportional to the negative gradient in the temperature and to the area

Archimedes Buoyancy principle - the force acting on a submerged or partially submerged object equals the weight of the liquid that the object displaces

The Law of Reflection states that the angle of the incident light ray is equal to the angle of the reflected light ray

Hubble's Law of Cosmic Expansion - established that the universe is made up of many galaxies

Kepler's law of planetary motion -that planets orbit the sun elliptically

UKS2 Year A – End Points	
Properties and changes of materials	• Know that heat travels from warmer materials to colder ones • Know that some materials let heat pass through them easily; these are thermal conductors (metals and sedimentary rocks) • Know some materials do not let heat pass through them; these are called thermal insulators (plastic, cork, wood, and fabrics) • Know that thermal insulators are good for keeping heat out as well as in • Know soluble materials dissolve in water • Know if a material does not dissolve, it is insoluble • Know dissolving a solid in water makes a solution • Know there are three ways to separate mixtures: sieving, filtering, and evaporation • Know sieving is when you pass a mixture of solids of varied sizes through mesh • Know filtering is when you pass a mixture of a solid and liquid through a mesh • Know evaporation separates soluble solids from water; the water evaporates and leaves the solid behind • Know in a reversible change a material turns into something that looks and feels different but is not changed forever – it can be changed back • Know all changes of state are reversible • Know mixing and dissolving are reversible changes • Know in an irreversible change a completely new material is formed and cannot be changed back • Know some things, react when you mix them (vinegar and bicarbonate of soda) to make new materials
Forces	• Know that friction is the force between surfaces that are touching. • Know rough surfaces, create lots of friction. • Know smooth surfaces do not create much friction. • Know friction produces heat. • Know air resistance is the force that slows down moving objects as they move through air. • Know objects, need to be streamlined to travel faster through the air and to travel slower through the air, you need a large surface area. • Know water resistance is the force that slows down moving objects as they move through water. • Know if you want to travel more quickly through water, the shape needs to be streamlined e.g. Dolphin has a streamlined body • Know that buoyancy is an object's ability to float in water or air.

	• Know that the force of gravity pulls objects towards the centre of the Earth regardless of where you are on the planet. • Know that Sir Isaac Newton (a British scientist) devised the laws of gravity • Know that the size of the gravitational force is more or less the same all over the Earth. • Know that levers, gears, and pulleys are simple mechanisms that enable a small force to have a greater effect • Know a lever is made from a long pole and pivot (fulcrum) examples are scissors, a wheelbarrow, and a stapler • Know a pulley is a rope running through a wheel, examples are window blinds, a flagpole and a well • Know gears are wheels with teeth that fit together. When one wheel is turned, the other wheel turns too but in the opposite direction. • Know that a smaller gear will turn faster than a larger one
Light	• Know light is a form of energy • Know light travels in straight lines • Know objects are seen because they emit or reflect light into our eyes • Know light that is not reflected by a surface is absorbed • know that light travels from light sources to our eyes and from light sources to objects and then to our eyes • know because light travels in straight lines that shadows will have the same shape as the objects that cast them • Know how to use diagrams and models to describe how light travels in straight lines • Know how to use diagrams and models to describe how light travels in straight lines when reflected from other objects • Know how to use models and diagrams to describe light travelling in straight lines past an opaque/translucent object to cast a shadow of the same shape
Earth & Space	• Know that our solar system consists of our star, the Sun, and everything bound to it by gravity – the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune • Know that dwarf planets such as Pluto; dozens of moons; and millions of asteroids, comets, and meteoroids are also within our solar system • Know Mercury, Venus, Earth and Mars are terrestrial planets • Know Jupiter and Saturn are giant gas planets and Uranus and Neptune are giant ice planets • Know that the Earth is a sphere, spins on an axis as it travels round the sun, when one sides faces the sun the other faces space • Know that the side facing the sun is bathed in light and heat (daytime) and the side facing space is cooler and darker (night) • Know that a day on Earth last 24 hours – how long it takes to orbit the sun • Know that the 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.

	• Know that the moon moves around the Earth in an approximately circular orbit, once around the Earth in approximately 27.3 days • Know that as the moon orbits the earth its position changes, relative to the stars.
Animals Including Humans	• Know prenatal development has a germinal phase, an embryonic phase, and a foetal phase • Know animals have different gestation periods • Know the stages in a human's life, include infancy, childhood, adolescent, adulthood, and old age • Know cell decline is part of becoming old • Know vision and hearing decline as animals get older • Know animals have different lifespans • know the changes that take place in children during puberty • Know a girl's hormonal changes cause the ovaries to release eggs and the monthly menstrual cycle is triggered • Know a boy's muscles become more developed and facial and body hair begins to grow during puberty

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Jodrell Bank Observatory School nurse to discuss changes during puberty	Spiritual – by showing willingness to reflect on their experiences within their family Social – working with other pupils when completing experiments Culture – understanding the importance of Isaac Newton's role in developing the principles of modern physics	Individual liberty - through discussion children talk about their experiences within their family life Mutual respect and tolerance – through listening to others' opinions when working with materials	Humility is taught when working as a team during experimentation

USK2 Science Year B	
POS **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 **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 diverse ways and that adaptation may lead to evolution **Living things and their habitats (life cycles)** •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 **Living things and their habitats (classification of living things)** •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 **Animals including humans (circulatory system and how to keep the body healthy)** •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 body's function •describe the ways in which nutrients and water are transported within animals, including humans	**Working scientifically**: **Fair & comparative testing** Recognise and control variables where necessary Use test results to make predictions for further investigations Prepare own tables to record data, including columns for taking repeat readings Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results How does the voltage of the batteries in a circuit affect the volume of the buzzer? **Research using secondary sources** Be able to talk about their degree of trust in the sources they used Present what they learnt in a range of ways e.g. different graphic organisers What are the differences between the life cycle of an insect and a mammal? How has our understanding of electricity changed over time? **Identifying, classifying & grouping** Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for Create branching databases (tree diagrams) and keys to enable others to name livings things and objects Be able to answer their question, describing causal relationships Measure using standard units using equipment that has scales involving decimals How would you make a classification key for vertebrates/invertebrates or microorganisms? How would you group electrical components and appliances based on what electricity makes them do? **Pattern seeking** Is there a relationship between a mammal's size and its gestation period? **Observation over time** How does my heart rate change over the day? Be able to answer their questions, describing the change over time Choose an appropriate form of presentation, including line graphs

Laws/theories

Physics: Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points

Biology: Darwin's theory – Natural Selection

UKS2 Year B – End Points	
Electricity	• know when a switch is open, the circuit is incomplete • know that by adding more batteries the bulb gets brighter or the buzzer becomes louder as there is a greater current • know current is the amount of electricity flowing through the circuit • know that the higher the voltage of a battery, the more powerful it is – the more current flowing through a circuit • know that using higher voltage batteries causes a brighter bulb or a louder buzzer • know that if you add more bulbs, the bulbs get dimmer • Know that if you add more buzzers, they buzz more quietly • Know several motors would each turn more slowly than just one • Know using longer wires between the components provides more resistance so bulbs become dimmer, and buzzers quieten • Know the symbols of a simple circuit • Know that in parallel circuits, electrical components are connected alongside one another, forming extra loops.
Evolution & Inheritance	• know humans can live all over the world because they can wear clothes and build houses suited to different conditions • know most plants and animals can only live in certain environments • know animals and plants are adapted to their habitat • know living things can develop adaptations to suit the place they live • know that the living things that are best adapted to their habitat are more likely to survive. • know that over time, increasingly of the animals and plants will end up with features that make them well-adapted to their habitat • know that animals and plants produce offspring that look like their parents • Know parent plants or animals pass on characteristics • know when living things change over time – this is evolution • Know Charles Darwin's (an English naturalist) scientific theory of evolution by natural selection became the foundation of modern evolutionary studies • Know an example of evolution is Darwin's finches – beaks adapted over time based on food source • know that fossils show how living things have changed – how they have evolved

Living things and their habitats (life cycles)	• Know that there are distinct types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. • Know that sexual reproduction in plants involves pollen from one flower fertilising the egg of another to produce a seed. • Know asexual reproduction in plants happens without pollen or an egg. The new plant grows from cuttings from the parent plant. • Know the life cycle of a dolphin (mammal) - live young born and get milk from mothers, grow from babies to adults, reproduce • Know the life cycle of a newt (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 • Know the life cycle of a butterfly (insect) - eggs laid by the female insect; eggs hatch and larva are born; when the larva moults for the last time, a pupa is formed • Know some insects only have 3 stages: born as an egg, hatches as a nymph and changes into an adult • Know the life cycle of a robin (bird) – egg, hatches and is fed by the parents, juvenile– leaves the nest when flight feathers are grown, adult attracts mate to reproduce • Know the life cycle of an alligator (reptile) - egg, hatches able to feed itself but stays with mother for at least a year, juvenile, adult • Know the naturalist David Attenborough • Know the animal behaviourist Jane Goodall • Know amphibians and insects go through metamorphosis
Living things and their habitats (Classification using observable characteristics)	• Know Carl Linnaeus as a pioneer of classification • Know to classify flowering plants into grasses, shrubs, cereals, and deciduous trees • Know to classify non-flowering plants into algae, mosses, ferns, and coniferous trees • Know to classify animals which are vertebrates – have backbones - (birds, fish, reptiles, mammals, amphibians) • Know to classify animals which are invertebrates – no backbones- into molluscs, annelids, arachnids, crustaceans, sponges, echinoderms and insects • Know micro-organisms can be classified into bacteria, viruses, fungi, algae, and protozoa
Animals including humans (Circulatory system and how to keep the body healthy)	• Know the circulatory system is made up of blood, blood vessels and the heart • Know blood moves food, waste oxygen and waste products around the body • Know there are three kinds of blood vessels: capillaries, veins, and arteries • Know arteries, carry oxygenated blood away from the heart to the body • Know veins, carry de-oxygenated blood back to the heart

	• Know exercise strengthens the muscles, develops the lungs, helps body coordination, uses up food for energy and can prevent the body getting fat and helps the body to sleep at nighttime • Know that taking health risks can damage the body • Know that smoking causes heart attacks, blocked arteries, lung cancer and breathing problems • Know sniffing solvents is extremely dangerous as damages the brain • Know that drinking alcohol slows down the reactions • Know heavy drinking damages the liver, heart, and stomach • Know drugs can be dangerous if misused and can cause damage to the brain • Know tobacco, sniffing solvent and some drugs are addictive

Experiences	**SMSC**	**British Values**	**WPAT/School Values**
Manchester Science Museum – electricity workshop Zoo-lab – life cycles Chester Zoo project	Spiritual- by asking questions about the world around them and how living things rely on and contribute to their environment. Moral – recognising the right choices to have a healthy body Cultural – through understanding how Charles Darwin's original theory of natural selection has influenced genetics and the way evolution shapes our world.	Mutual respect and tolerance are taught when discussing people's beliefs around evolution Individual liberty – recognising that people have a choice in how they look after their body (choice of diet)	Responsibility is taught through keeping the body healthy discussions Honesty is taught through discussions of looking after the body