



SCIENCE CURRICULUM COVERAGE

SCIENCE INTENT

Here at Wheatlands Primary School, in line with the National curriculum, science is taught with the intent of giving children a secure knowledge and conceptual understanding of the world. We understand it is important for children to **experience**, and be explicitly taught, different enquiry types that encourage them to be inquisitive. We aim to equip our pupils with the knowledge base and **scientific skills** required to understand the uses and implications of science, today and for the future, which includes all elements of STEM (Science, Technology, Engineering and Maths) where applicable.

At Wheatlands, a strong emphasis is placed on developing independent and thoughtful learners who are resilient. Throughout the programme of study, children will acquire and develop the **key knowledge** and **vocabulary** identified within each year group, as well as the application of specific scientific skills.

Through each unit or block of work, we aim to allow children time to **explore**, make links with prior learning, practise and apply their knowledge and skills in different situations, as well as reviewing their learning and challenging any misconceptions they might hold so that learning is not superficial. For those more able learners, we ensure additional challenges are given to allow children to further apply their knowledge and understanding and explain 'why'.

Science permeates every aspect of daily life and wherever possible, children will learn about current science affairs and links will be made to their own science learning.

At each stage, teaching and learning strategies promote **discussion**, collaborative working and **thinking skills** so that children are supported in developing the confidence and resilience they need to succeed.

Science: EYFS

Understanding the World- The Natural World

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
-Show curiosity about objects, people and the world around them -Ask why things are happening	- Learn by trial and error	- Engage in new experiences and open ended play	-Closely observe what animals, people and objects do -Use senses to explore the world around them -Choose resources they need for their activities -Handle equipment effectively	-Make links and notice patterns in their play -Begin to group and sequence -Create simple representations of people, objects and events	-Notice similarities and differences in places, objects, materials and living things -Answer how and why questions about their experiences -Explain why some things happen	• Show an awareness of cause and effect
Birth to three years	Three to four years old			Reception (five year old)	Statutory Early Learning Goals	
• Repeat actions that have an effect. • Explore materials with different properties. • Closely observes what animals, people and vehicles do. • Explore natural materials, indoors and outside • Explores and responds to different natural phenomena in their setting and on trips. • Developing a curiosity, appreciation and respect for living things.	• Use all their senses in hands on exploration of natural materials. • Talks about what they see using basic vocabulary. • Explore collections of materials with similar and/or different properties. • Talks about what they see, using a wide vocabulary. • Explores how things work. • Knows how to plant seeds and care for growing plants. • Understands the key features of the life cycle of a plant and an animal. • Begins to understand the need to respect and care for the natural environment and all living things. • Explores and talks about different forces they can feel. E.g. how the water pushes up when they try to push a plastic boat underneath. • Talks about the differences between materials and changes they notice. E.g. floating and sinking, light and dark.			• Explores the natural world around them. • Discuss and understand how we care for the natural world around us. • Sings songs and joins in with rhymes and poems about the natural world. • After close observation, draws pictures of the natural world, including animals and plants. • Describes what they see, hear and feel whilst outside. • Recognises familiar plants and animals whilst outside. • Recognises some environments that are different to the one in which they live. • Understands and can talk about the effect of changing seasons on the natural world around them.	• Explores the natural world around them, making observations and drawing pictures of animals and plants. • Knows 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 and changing states of matter.	

Personal, Social, Emotional Development and Communication and Language

	• Children try a range of foods at mealtimes. • Begins to show good eating habits and behaviours. • Able to go to the toilet independently. • Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" • Is increasingly independent in meeting their own care needs, e.g. brushing teeth, using the toilet, washing and drying their hands thoroughly • Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	• Manages their own needs such as washing their hands, going to the toilet independently. • Knows and talks about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, sensible amounts of 'screen time', having a good sleep routine, being a safe pedestrian. • learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts	• Manages their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. • Make comments about what they have heard and ask questions to clarify their understanding
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Science: Key Stage 1 Year 1

Working Scientifically Skills

In KS1, children will specifically develop their close observations.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Ask simple questions.	Make a prediction before testing.	Perform simple tests.	Observe closely, using simple equipment. Identify and classify.	Gather and record data to help answer questions.	Use appropriate scientific language to communicate ideas and what they have found out.	Use their observations and ideas to suggest answers to questions.
Biology				Chemistry		Physics
Animals, including Humans	Animals, including Humans	Plants		Everyday Materials		Seasonal Change
Name common animals	Human body and senses	- Common plants - Plant structure		- Properties of materials - Grouping materials		- The four seasons - Seasonal weather

	- Know and name common animals (pets, farm, zoo, minibeasts and seaside) including amphibians, reptiles, mammals, fish and birds - Know and classify animals by what they eat (carnivore, herbivore and omnivore) - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets	- identify, name, draw and label the basic parts of the human body that can be seen - say which part of the body is associated with each sense.	- Know and name a variety of common wild and garden plants growing locally, including deciduous and evergreen trees. - Know and name the structure of a variety of common flowering plants such as petals, stem, leaves and root of a plant - Know and name the structure of trees such as roots, trunk, branches and leaves.	- Know the name of the materials an object is made from. - Know about the properties of everyday materials.	- Name the seasons and know about the type of weather in each season - Observe changes across the four seasons.
Scientific Skills	- Make close first hand observations of animals from each of the groups. - Use simple charts to identify unknown animals. - Use resources to answer questions about animals.	- Make first-hand close observations of parts of the body e.g. hands, eyes - Take measurements of parts of their body. - Look for patterns between people e.g. Do people with big hands have big feet? - Classify people according to their features. - Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?	- Make close observations of 2 flowers or two leaves. - Classify leaves or flowers using a range of characteristics.	- Classify objects made of one material in different ways e.g. a group of objects made of metal. - Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. - Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters. - Use their test to answer a question e.g. 'Which cloth is the most absorbent?	- Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. - Present this information in different ways to compare the seasons.
Possible learning challenges	Questions- Why are humans not like tigers?	Questions- Which birds and plants would Little Red Riding Hood find in Locke Park?		Questions- Which materials should the Three Little Pigs have used to build their house? What would Aliens think of life on planet Earth? Can you describe things that are similar and different between materials? Can you explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate?	Questions- Why does it get dark earlier in winter? How do the seasons impact on what we do? Can you observe features in the environment and explain that these are related to a specific season?

				Can you explain what happens to certain materials when they are cooled, e.g. jelly, heated chocolate?	Can you observe and talk about changes in the weather? Can you talk about weather variation in different parts of the world?
Vocabulary	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, Names of <i>amphibians, reptiles, mammals, fish, birds that are: pets, minibeasts, zoo, farm and seaside animals. herbivore, omnivore, carnivore</i>	head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, <i>penis, testicles, vulva</i> Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue	leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area	object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through	Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length

Science: Key Stage 1 Year 2

Working Scientifically Skills In KS1, children will specifically develop their close observations.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Ask simple questions.	Make a prediction before testing.	Perform simple tests.	Observe closely, using simple equipment. Identify and classify.	Gather and record data to help answer questions.	Use appropriate scientific language to communicate ideas and what they have found out.	Use their observations and ideas to suggest answers to questions.
Biology					Chemistry	

All living things and their habitats		Animals, including Humans	Plants	Everyday Materials
• <i>Alive or dead</i> • <i>Habitats</i> • <i>Adaptations</i> • <i>Food chains</i>		• <i>Animal reproduction</i> • <i>Healthy living</i> • <i>Basic needs</i>	• <i>Plant and seed growth</i> • <i>Plant reproduction</i> • <i>Keeping plants healthy</i>	• <i>Identify different materials</i> • <i>Name everyday materials</i> • <i>Properties of materials</i> • <i>Compare the use of different materials</i>
• Classify things by living, dead or never lived • Know how a specific habitat provides for the basic needs of things living there (plants and animals) • Match living things to their habitat • Name some different sources of food for animals using the idea of a simple food chain.		• Know the basic stages in a life cycle for animals, (including humans) • Know why exercise, a balanced diet and good hygiene are important for humans • Find out about and describe the basic needs of animals (including humans) to survive- water, food, air.	• Observe and describe how seeds and bulbs grow into plants. • Describe how plants need water, light and a suitable temperature to grow and stay healthy.	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Know how materials can be changed by squashing, bending, twisting and stretching • Know why a material might or might not be used for a specific job
Scientific Skills	• Explain in simple terms why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat.	• Ask questions relating to human stages. • Observe growth of an animal over time. • Explore the effects of exercise on their body. • Carry out simple tests to find out the importance of hand washing and hygiene.	• Make close observations of and classify seeds and bulbs. • Carry out simple tests to compare growth and use findings to explain what plants need in order to grow and stay healthy (water, light & suitable temperature) • Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.	• Test the properties of materials for particular uses

Possible learning challenges	Questions- Why would a dinosaur not make a good pet?	Questions- How will 5 a day help me to be healthy? How could you be the next Mo Farah or?	Questions- How can we grow our own salad? How can you be the next master chef?	Questions- What is our school made of? Which materials did they use to build the Riverside Stadium?
Vocabulary	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats- woodland, seashore, pond, marshland Names of micro-habitats e.g. under logs, in bushes etc.	offspring, reproduction, growth, child, young/old stages (examples chick/hen, baby/child/adult, caterpillar/butterfly) exercise, breathing, heartbeat, hygiene, germs, disease, food types (examples of- meat, fish, vegetables, bread, rice, pasta)	As for Year 1 plus: light, shade, sun, warm, cool, water, grow, healthy	Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Science: Year 3

Working Scientifically Skills

In LSK2, children will specifically develop a more systematic approach.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Ask relevant questions.	Make predictions using scientific knowledge and understanding before or during an investigation.	Set up simple practical enquiries, comparative and fair tests.	Make systematic and careful observations, and take accurate measurements using standard units when appropriate.	Gather and record findings using simple scientific language, as well as drawings, labelled diagrams, keys, bar charts or tables.	Report on findings from enquiries. Identify differences, similarities or changes related to simple scientific ideas and processes.	Use results to draw simple conclusions, suggest improvements and raise further questions. Use scientific evidence to answer questions or to support their findings.
Biology		Chemistry		Physics		
Animals, including humans	Plants	Rocks		Forces	Light	
• Nutrition • Exercise and health	• Basic structure and functions • Life cycle • Water transportation • Plant life	• Fossil formation • Compare and group rocks and soils		• Different Forces	• Reflections	
• Know about the importance of a nutritious, balanced diet • Know that humans and some other animals have skeletons and muscles for support,	• Know the function of different parts of flowering plants and trees • Know and observe how	• Observe, compare and group rocks based on their appearance and physical properties, giving reasons		• Compare how objects move on different surfaces • Know how some forces require contact and some do not but	• Know that dark is the absence of light • Know that light is needed in order to see and is reflected from a surface	

	protection and movement Compare, contrast and classify skeletons of different animals.	water is transported within plants. - Explore the part that flowers play in the life cycle of flowering plants. - Explore the requirements of plants for life and growth and how they vary from plant to plant.	- Describe in simple terms how fossils are formed - Recognise that soils are made from rocks and organic matter.	magnetic forces can act a distance. - Observe how magnets attract and repel and predict whether two poles will attract or repel depending on which poles are facing. - Observe how magnets attract some materials and not others. - Compare and group everyday materials and identify some magnetic materials.	- Know and demonstrate how a shadow is formed and explain how a shadow changes shape - Know about the danger of direct sunlight and describe how to keep protected
Scientific Skills	- Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? - Research skeletons	- Observe flowers carefully to identify the pollen. - Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. - Observe seeds being blown from the trees e.g. sycamore seeds. - Research different types of seed dispersal. - Classify seeds in different ways.	- Observe, compare and group rocks based on their appearance and physical properties, giving reasons - Devise tests to investigate hardness and absorbency - Devise a test to investigate the water retention of soils. - Observe how soil can be separated through sedimentation.	- Predict whether magnets will attract or repel and give a reason - Explore the way magnets behave and how they work at a distance. - Devise an investigation to test the strength of magnets.	- Explore how different objects are more or less visible in different levels of lighting. - Explore how objects with different surfaces (e.g. shiny vs matt) are more or less visible. - Look for patterns and predict how shadows vary as the distance between a light source and an object or surface is changed. - Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground.

Possible learning challenges	Questions: -How can Usain Bolt move so quickly? -Can you explain how the muscular and skeletal systems work together to create movement?	Questions: -Can you explain how people, weather and the environment can affect living things? -Can you explain how certain living things depend on one another to survive? -How does a blossom become an apple?	Questions: -What do rocks tell us about the way the Earth was formed? -Can you classify igneous and sedimentary rocks? -Can they begin to relate the properties of rocks with their uses?	Questions: -What do we mean by attract and repel? -What other force do you know about and how can you classify forces? -Can you investigate the strengths of different magnets and find fair ways to compare them? - Can you explain why an object will move faster if it is rolling down a hill or a slope?	Questions: How far can you throw your shadow? -Can you explain why lights need to be bright or dimmer according to need? • Can you explain the difference between transparent, translucent and opaque? Can they explain why their shadow changes when the light source is moved closer or further from the object?
Vocabulary	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, limestone, coal, shale, iron ore, sandstone, granite, marble, chalk, slate, soil, peat, sandy/chalk/clay soil	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight

Science: Year 4

Working Scientifically Skills

In LSK2, children will specifically develop a more systematic approach.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Ask relevant questions.	Make predictions using scientific knowledge and understanding before or during an investigation.	Set up simple practical enquiries, comparative and fair tests.	Make systematic and careful observations, and take accurate measurements using standard units when appropriate.	Gather and record findings using simple scientific language, as well as drawings, keys, bar charts or tables.	Report on findings from enquiries. Identify differences, similarities or changes related to simple scientific ideas and processes.	Use results to draw simple conclusions, suggest improvements and raise further questions. Use scientific evidence to answer questions or to support their findings.
Biology		Chemistry		Physics		
Animals, including humans	Living things and their habitats	States of Matter		Electricity	Sound	
- Digestive system - Teeth	- Grouping living things - Classification keys - Adaptation of living things.	- Compare and group materials - Solids, liquids and gases - Changing state		- Uses of electricity - Simple circuits and switches. - Conductors and insulators	- How sounds are made - Sound vibrations - Pitch and Volume	
- Describe the simple functions of the basic parts of the human digestive system - Identify and know the different types	- Use classification keys to group, identify and name living things - Know how changes to an environment	- Classify materials according to whether they are solids, liquids and gases. - Know that materials change state when they are heated or cooled and		- Identify common appliances that require electricity to function - Construct a simple circuit, naming the components (including	- Identify how sound is made, associating some of them with vibrating - Know how sound travels from a source to our ears	

	of human teeth and their functions Construct and interpret a variety of food chains, identifying producers, predators and prey.	could endanger living things Explore how environments may naturally change as well as human impact, both positive and negative, on environments.	measure the temperature at which this happens	cells, wires, bulbs, switches and buzzers) - Know the function of a switch - Know the difference between a conductor and an insulator and associate metals with being good conductors - Identify whether a lamp with light in a simple series circuit	- Find patterns between pitch and the object producing a sound - Find patterns between the volume of a sound and the strength of the vibrations that produced it - Know what happens to a sound as it travels away from its source
Scientific Skills	-Create a model of the digestive system using household objects. -Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). -Use and construct food chains to identify producers, predators and prey	-Observe plants and animals in different habitats throughout the year. -Compare and contrast the living things observed. -Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. -Use secondary sources to identify animals in a habitat and find out what they eat.	-Observe a range of materials melting e.g. ice, chocolate, butter. Investigate how to melt ice more quickly. -Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. -Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). -Observe water evaporating and condensing e.g. on cups of icy water and hot water. -Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers.	-Construct a series circuit -Predict and test whether a lamp will light within a circuit -Explore which materials can be used instead of wires to make a circuit. -Classify the materials that were suitable/not suitable for wires. -Explore how to connect a range of different switches and investigate how they function in different ways. -Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm. -Apply their knowledge of conductors and insulators to design and make different types of switch. N.B. -Children should be given one component at a time to add to circuits.	-Explore how string telephones or ear gongs work. -Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. -Measure sounds over different distances. -Measure sounds through different insulation materials.

Possible learning challenges	Questions: -Why are sharks teeth different to ours? -What happens to a piece of chocolate once you swallow it? -Why would it not be sensible to eat burgers everyday?	Questions: -Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore) -Can they explain how certain living things depend on one another to survive?	Questions: -Can you group and classify a variety of materials according to the impact of temperature on them? -Can you explain what happens over time to things such as puddles on the playground or washing hanging on a line? -Can you relate temperature to change of state of materials? -How would we survive without water?	Questions: -Can you explain how a bulb gets lighter? -Can you recognise of all metals are conductors of electricity? -Can you work out which metals can be used to connect across a gap in a circuit? -Can you explain why cautions are necessary for working safely with electricity?	Questions: -Can you explain why sound gets fainter or louder according to distance? -Can you explain how pitch and volume can be changed in a variety of ways? -Can you work out which materials give the best insulation for sound?
Vocabulary	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, producer, predator, prey,	classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol	sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

Science: Year 5

Working Scientifically Skills

In USK2, children will specifically develop more independence.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary.	Make and justify a prediction using scientific information or knowledge.	Use test results to make predictions to set up further comparative and fair tests.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar or line graphs.	Report and present findings from enquiries, in oral and written forms using appropriate scientific language.	Explain degree of trust in results. Identify and evaluate scientific evidence that has been used to support or refute ideas or arguments.
Biology		Chemistry		Physics		
All living things and their habitats	Animals, including humans	Properties and changes in materials		Forces		Earth and Space
- Life cycles – plants and animals - Reproductive processes - Famous naturalists.	Changes as humans develop from birth to old age	- Compare properties of everyday materials - Soluble/ Dissolving - Reversible and irreversible substances		- Gravity - Friction - Forces and motion of mechanical devices		- Movement of the Earth and the planets - Movement of the moon - Night and Day
- Know the life cycle of different living things e.g. mammal, amphibian, insect and bird - Know the differences between different life cycles - Know the life process of reproduction in plants - Know the life process of reproduction in animals	-Know about changes as humans develop from birth to old age.	- Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets - Know and explain how a material dissolves to form a solution - Describe how to recover a substance from a solution		- Know what gravity is and its impact on our lives - Identify and know the effect of air and water resistance - Identify and know the effect of friction that acts between moving surfaces. - recognise that some mechanisms including		- Know about and explain the movement of the Earth and other planets relative to the Sun - Know about and explain the movement of the Moon relative to the Earth

			• Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) • Know and demonstrate that some changes are reversible and some are not • Know how some changes result in the formation of a new material and that this is usually irreversible	levers, pulleys and gears allow a smaller force to have a greater effect	• Know and demonstrate how night and day are created • Describe the Sun, Earth and Moon (using the term spherical)
Scientific Skills	• Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. • Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. • Look for patterns between the size of an animal and its expected life span. • Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. • Take cuttings from a range of plants e.g. African violet, mint. • Plant bulbs and then harvest to see how they multiply. • Use secondary sources to find out about pollination.	• Create a timeline to indicate stages of growth in humans	• Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. • Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. • Investigate rates of dissolving by carrying out comparative and fair test. • Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. • Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. • Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?	• Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. • Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. • investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. • Explore how levers, pulleys and gears work. • Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. • Research George Stephenson and his development of the first steam engine.	• Use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and the Moon around the Earth. • Use sec*ondary sources to help make a model to show why day and night occur. • Make first-hand observations of how shadows caused by the Sun change through the day. • Make a sundial. • Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel.

Possible learning challenges	Questions: -Do all animals start their life as an egg? -Can you work out which animals depend on each other for survival? -What is the life expectancy of different animals and why?	Questions: -What can you do now that you couldn't as a baby? -What do you understand about the term 'puberty'?	Questions: -How could you solve a crime by using forensic evidence? -Can you think of five materials that can be changed and reversed, and five that cannot? -Can you give any examples of how chemical changes can impact our lives?	Questions: -Why will a car always move faster than a boat? -Can you describe and explain how motion is affected by forces? -Can you work out how water can cause resistance to floating objects?	Questions: -Can we describe the Sun and Earth as Space cousins? -Can you compare the different time of day at different places on the Earth?
Vocabulary	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Puberty – the vocabulary to describe sexual characteristics	thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets

Science: Year 6

Working Scientifically Skills
In USK2, children will specifically develop more independence.

<u>Ask Questions</u>	<u>Making Predictions</u>	<u>Setting up Tests</u>	<u>Observing and Measuring</u>	<u>Recording Data</u>	<u>Interpreting and Communicating Results</u>	<u>Evaluating</u>
						
Plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary.	Make and justify a prediction using scientific information or knowledge.	Use test results to make predictions to set up further comparative and fair tests.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar or line graphs.	Report and present findings from enquiries, in oral and written forms using appropriate scientific language.	Explain degree of trust in results. Identify and evaluate scientific evidence that has been used to support or refute ideas or arguments.
Biology				Physics		
Animals, including humans	Living things and their habitats	Evolution and Inheritance		Electricity	Light	
- The circulatory system - Water transportation - Impact of exercise on body.	Classification of living things and the reasons for it	- Identical and non identical offspring - Fossil evidence and evolution. - Adaptation and evolution.		- Electrical components - Simple circuits - Fuses and voltage	- How light travels - Reflection - Ray models of light	
-Identify and name the main parts of the human circulatory system -Know the function of the heart, blood vessels and blood -Know the impact of diet, exercise, drugs and lifestyle on health -Know the ways in which nutrients and water are transported in animals, including humans	-Classify living things into broad groups according to observable characteristics and based on similarities and differences including micro-organisms, plants and animals -Give reasons for classifying plants and animals in a specific way	-Know how the Earth and living things have changed over time -Know how fossils can be used to find out about the past -Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) -Know how animals and plants are adapted to suit their environment -Know about evolution and link to adaption.		-Compare and give reasons for why components work and do not work in a circuit -Draw circuit diagrams using correct symbols -Associate the number and voltage of cells in a circuit to the brightness of a lamp or the volume of a buzzer	-Know that light appears to travel in straight lines -Know how we see objects because they give out or reflect light into our eye -Know how we see objects because light travels from light sources to our eyes or from light sources to objects and then to our eyes. -Explain why shadows have the same shape as the objects that cast them	

Scientific Skills	• Create a role play model for the circulatory system. • Carry out a range of pulse rate investigations: ◦ pattern seeking – exploring which groups of people may have higher or lower resting pulse rates ◦ observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) ◦ pattern seeking – exploring recovery rate for different groups of people. • Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources.	• Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. • Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. • Look for patterns between the size of an animal and its expected life span. • Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. • Plant bulbs and then harvest to see how they multiply. • Use secondary sources to find out about pollination.	• Design a new plant or animal to live in a particular habitat. • Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity. • Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution. • Make observations of fossils to identify living things that lived on Earth millions of years ago. • Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs. • Compare the ideas of Charles Darwin and Alfred Wallace on evolution. • Research contributions made by local scientists Albany and John Hancock and Joseph Alder. • Research the work of Mary Anning and how this provided evidence of evolution.	• Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower. • Make circuits to solve particular problems, such as a quiet and a loud burglar alarm. • Carry out fair tests exploring changes in circuits.	• Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. • Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets.
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Possible Learning Challenges	Questions: -Why can the heart be described as the most important pump we have? -What is a pulse and why do we have one? -Why could we describe blood as the body's river system? -Can you compare the organ system of humans with another animal?	Questions: -Can you discover the special attributes that some animals and plants have to help them survive? -What are micro-organisms and how would you classify them? -Why might some animals and plants be endangered?	Questions: -Why do you not look exactly like your mum or dad? -What is DNA? Can you explain what it is? -What are advantages and disadvantages of specific adaptations?	Questions: -Can you explain the danger of short circuits? -How do traffic lights work?	Questions: -Can you explain how different colours of light can be created? -How do your eyes work? -How do we know that light travels faster than sound? -How can you use mirrors to see around corners?
Vocabulary	heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, sexual plantlets, runners, bulbs, cuttings	offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage	As for Year 3 - Light, plus straight lines, light rays