SCIENCE - Curriculum Overview

Science at St Thomas's Primary School

Intent	Scientific enquiry is at the heart of our science curriculum – promoting discovery and wonder amongst all of our children. Enquiry work is underpinned by explicitly taught scientific theory, incorporating rich and specific vocabulary – children are encouraged to use acquired knowledge as a basis for investigation and questioning. Our children are provided with hands-on, exploratory opportunities enabling them to deepen their understanding. Inherently inquisitive, children at St Thomas' are given the opportunity to explore many scientific concepts. In the Early Years Foundation Stage, scientific concepts are explored through play, child-initiated investigation and adult-led input that follows the children's ideas and interests. Children progress onto formal strands of 'working scientifically' as they advance through the key stages. By the time children leave year 6, they will confidently understand the ways in which they can measurably explore the world around them, choosing relevant and effective investigation methods.
Imple-ment	At St Thomas, we implement a science curriculum that is progressive throughout the school covering the key strands of The National Curriculum. Science is taught discretely, focusing on the knowledge and skills stated in the National Curriculum, ensuring that knowledge builds progressively and that children develop skills systematically. Connections between subjects are made to reinforce learning where appropriate. Science teaching focuses on enabling children to think as scientists. A variety of teaching approaches are used and lessons are planned to include opportunities for children to work as pairs, in groups and to work independently. New information and knowledge is introduced in small steps. Effective questioning is a crucial component of all our lessons. Key questions are planned to encourage children to think about their learning, to reflect upon previous learning and to make connections between new and existing learning. We also encourage them to build upon their peers' learning. We encourage adults and children to use both rich language and precise vocabulary linked to the subject area that they are studying so that they can understand it and can then use it to reason, articulate and make generalisations. To ensure that the children get the best support in lessons adaptations are made in lesson design and resources.
Impact	Evidence through pupil voice and outcomes in books will show that children can confidently articulate and demonstrate their scientific knowledge and understanding (including key scientific concepts) using the correct vocabulary. Children will be able to make connections between the different scientific concepts they have studied and apply their learning to a range of scenarios to aid their understanding of the world around them.
Context	**"I come that they might have life and life in all its fullness." The Gospel of John 10 v 10 Our church lies at the centre of our local area.** Before 1758, Heaton Chapel did not exist but was simply part of Heaton Norris. The need for a chapel was identified by Parliament in 1645 but it was another 100 years until the church was dedicated 28th October 1758. The main road from Manchester to Stockport ran through Heaton Chapel. There was a toll gate opposite the church. Heaton Chapel Station was built in 1851 close to the St. Thomas' Rectory because of the clergy man at the church. A large biscuit works was opened in 1918 by McVitie and Price. In this location chocolate covered biscuits such as Penguin biscuits and Jaffa cakes are made. Today, St Thomas' has a diverse cohort of pupils. Science capital varies from family to family. We educate the children of doctors, published scientists and scientific researchers alongside the children of nursery workers, taxi drivers and shop assistants

Learning and Growing in the Sight of God

Learning	Growing	Sight of God
At St Thomas we have created a balance of knowledge and skills in each unit of study. Knowledge and therefore learning is built upon in each lesson, with regular opportunities given for knowledge retrieval. Children are given every chance of success in order to maximise motivation	At St Thomas the children are encouraged throughout each aspect of science they study to empathise with the people or places they affect, to explore different viewpoints and to **grow** their understanding of themselves and others.	Our church is at the centre of our community and our school. We link our Christian Values throughout our curriculum and work and learn together in the sight of God.

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Substantive

Substantive Knowledge

Substantive knowledge refers to the residual knowledge that children should take away from the unit after it has been taught. It is the knowledge of the products of science, such as models, laws and theories.

Disciplinary

Disciplinary Knowledge

Disciplinary knowledge refers to what our children need to know about how science establishes and refines scientific knowledge e.g How can the substantive knowledge learned in class about plants be used to test a hypothesis like, 'Where is the best place for my plant to grow?'

Disciplinary Concepts

Disciplinary concepts are concepts used in the study of science. They form the basis of many questions' that scientists explore about the world and include observation, pattern seeking, comparison, classifying and specific research from secondary sources. Coupled with the discreet teaching of how to generate scientific explanations (both verbally and written), present and analyse data (in-line with our rigorous mathematics curriculum) and allowing the children to develop the skills needed to use scientific apparatus, these concepts will enable children to ask and explore scientifically-valid questions, create connections, identify contrasts, examine trends and construct analyses.

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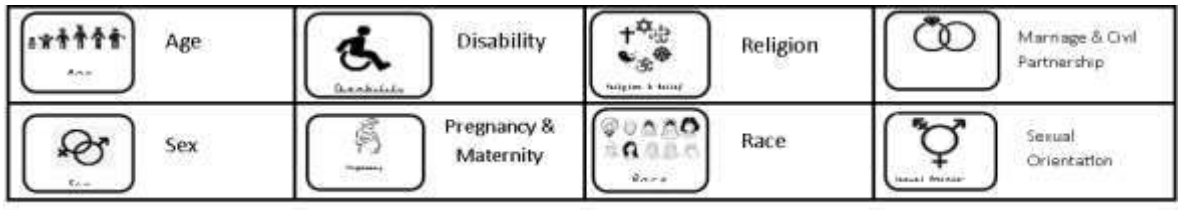
Knowledge of methods that scientists use to answer questions. ***Thinking and investigating like a scientist***	**Knowledge of apparatus and techniques, including measurement.** ***Using equipment and measuring like a scientist***
	
This covers the diverse methods that scientists use to generate knowledge, not just fair testing. For example, use of models, chemical synthesis, classification, description and the identification of correlations (pattern-seeking) have played important roles, alongside experimentation, in establishing scientific knowledge.	This covers how to carry out specific procedures and protocols safely and with proficiency in the laboratory and field. It includes the accurate measurement and recording of data. Pupils learn that all measurement involves some error and scientists put steps in place to reduce this.
Knowledge of data analysis. ***Presenting information and making links like a scientist***	**Knowledge of how science uses evidence to develop explanations.** ***Learning and explaining like a scientist***
	
This covers how to process and present scientific data in a variety of ways to explore relationships and communicate results to others. Pupils learn about different types of tables and graphs and how to identify correlations.	This covers how evidence is used, alongside substantive knowledge, to draw tentative but valid conclusions. It includes the distinction between correlation and causation and knowing that explanation is distinct from data and does not simply emerge from it. Pupils learn how scientific models, laws and theories develop over time, including the importance of technology and the role of the scientific community in peer review.

SCIENCE - Curriculum Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
Reception	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
Year 1	Animals – including humans HUMAN ELEMENT	Everyday Materials	Animals – including humans ANIMAL ELEMENT Seasons	Plants	Seasons	Everyday materials Part 2
Year 2	Animals including humans		Living things and their habitats		Materials	Plants
Year 3	Forces and Magnets	Rocks and Fossils	Animals including Humans	Animals including Humans	Light	Plants
Year 4	Electricity	Scientists and Inventions	Animals including Humans	States of Matter	Sound	Living things and their habitats
Year 5	Lifecycle (Continuous) Properties and changes of materials	Lifecycles (Cont.) Forces	Lifecycles (Cont.) Earth and Space	Lifecycles (Cont.)	Lifecycles (Cont.) Animals including Humans	Lifecycles
Year 6	Animals including humans 'The Circulatory System'	Evolution and Inheritance 'Charles Darwin & his Discoveries'	Living things and their habitats	Electricity	Light	

SCIENCE - Curriculum Overview

Nursery	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
General Theme	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
Hook Book - A	What makes Me am Me! Ben Faulkes	Meerkat Christmas Emily Gravett	Naughty Bus Jan and Jerry Oke	Giganotosurus Johnny Duddle	The Pirates are coming John Condon	The Sea Saw Tom Percival
Hook Book- B	Can I Build Another Me? Shinsuke Yoshitake	A World for Me and You Uju Asika	The Train Ride June Crebbin	Twist and Hop Minibeast Bop Tony Mitton & Guy Parker Rees	Supertato Sue Hendra	The Snail and the Whale by Julia Donaldson
St Thomas' Value	Compassion	Trust	Perseverance	Faith	Community	Joy
Knowledge and Understanding of the World is a Specific Area of Learning. It relates to children's everyday lives, their homes, families, other people, the local environment and community, and the wider world. Through different types of play, active, and experiential learning opportunities as well as practical activities, children will be provided with meaningful experiences. These will stimulate their senses as well as encourage them to ask questions, explore and wonder at their environment. They will undertake investigations that engage their interests, and develop awareness of the beliefs and views of others.						
The Natural World – Development Matters (UTW) Changes and Seasonal Change	I show awareness of change with some adult support.		I can begin to talk about how the weather changes, and that different places/countries have different weather. I can name some types of weather, e.g. rainy, sunny, windy, snowy, cloudy and stormy.		I can talk about some natural features that I see and feel during different seasons, including different weather. I can talk about the clothes that I need for different seasons/ weather and why.	
Materials	I can talk about materials. (Collections of the same materials, e.g., shells, leaves) I can talk about what I can see.		I can explore collections of different materials with similar and different properties.		I can name some common materials, e.g. sand, wood, glass, brick, clay, fabric etc with adult support	
Forces, Movement and Sound	I can talk about how things work I can talk about familiar sounds at home and school.		I understand that sound can come from a range of sources.		I describe what I see feel and hear. I can identify the source of a range of sounds.	
Living Things— Animals, Humans, Plants /conservation	I can name some animals correctly and begin to describe them with adult support.		I can show some awareness that living things need to be cared for and treated with respect.		I can examine plants to find out more about them. I use my senses to explore.	
Vocabulary	Rainy, sunny, windy, cold, hot, weather, seasons, sounds, noise, loud, quiet, animal, flower, colour, big, small		Respect, care, look after, grow, change, rough, soft, hard, smooth, hot, cold		Plant, grow, flower, petal, seed, water, sunshine, soil, sand, wood, glass, brick, clay, fabric, seasons, autumn, spring, summer, winter, change	
Scientific Enquiry Types **Golden Threads**						
Characteristics of Effective Learning (Disciplinary Knowledge – skills we need to learn)	**Playing and Exploring** – Children investigate and experience things and have a go. Children who actively participate in their own play develop a larger store of information and experience to draw on which positively supports their learning. **Active Learning** – Children concentrate and keep on trying if their encounter difficulties. They are proud of their own achievements. For children to develop into self-regulating lifelong learners they are requires to take ownership, accept challenges and learn persistence. **Creating and thinking critically** - Children develop their own ideas and make links between these ideas. They think flexibly and rationally, drawing on previous experiences which help them to solve problems and reach conclusions.					
Protected Characteristics						

SCIENCE - Curriculum Overview

Nursery	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
General Theme	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
Hook Book - A	What makes Me am Me! Ben Faulkes	Let's all Creep through Crocodile Creek Johnny Lambert	Naughty Bus Jan and Jerry Oke	Giganotosurus Johnny Duddle	The Pirates are coming John Condon	The Sea Saw Tom Percival
Hook Book- B	Can I Build Another Me? Shinsuke Yoshitake	A World for Me and You Uju Asika	The Train Ride June Crebbin	Twist and Hop Minibeast Bop Tony Mitton & Guy Parker Rees	Supertato Sue Hendra	The Snail and the Whale Julia Donaldson
Enhanced Provision	Books on weather Books on seasons Leaves, pine cones, conkers etc.	Domestic animals	Exploring different natural materials and textures indoors and outdoors. Exploring different vehicles speed using pipes, ramps and other small world structures, e.g blocks.	Sow seeds to create an Easter Garden. Water flowers and look for signs of spring. Making music/ body percussion to create sounds of Dinosaurs Fossil printing using fossil tiles on playdough and in paint.	Plants Materials	Materials Seaside objects
Topic Time **DEAL**	Looking at the chang-ing season with adult support	Exploring domestic animals and what they need		What do Dinosaurs eat?/ Healthy eating. How do Dinosaurs move?	Explore materials—use the senses	Explore materials—use the senses
Experiential Opportunities	Walk around the outdoor provision			Dental Nurse healthy Teeth		Beach day in school

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Reception	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
General Theme	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
Hook Book - A	What makes Me am Me! Ben Faulkes	Meerkat Christmas Emily Gravett	Naughty Bus Jan and Jerry Oke	Giganotosurus Johnny Duddle	The Pirates are coming John Condon	The Sea Saw Tom Percival
Hook Book- B	Can I Build Another Me? Shinsuke Yoshitake	A World for Me and You Uju Asika	The Train Ride June Crebbin	Twist and Hop Minibeast Bop Tony Mitton & Guy Parker Rees	Supertato Sue Hendra	The Snail and the Whale by Julia Donaldson
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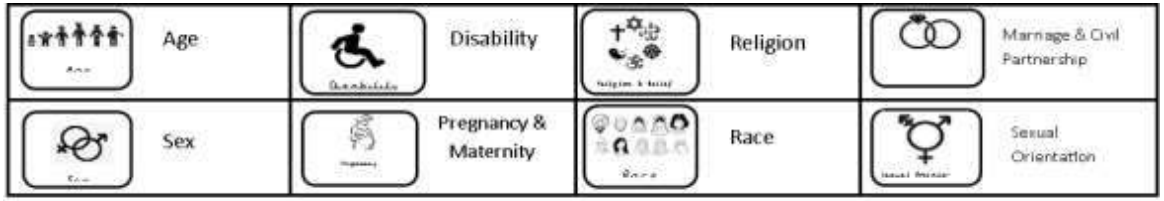
The Natural World – Development Matters (UTW) Changes and Seasonal Change	I can name the four seasons and I can order the four seasons.		I can describe about how the seasons can affect the natural world and how things grow. e.g. acorns and conkers are found in autumn and some trees have no leaves in winter.		I understand some important processes and changes in the natural world around them, including the seasons. I can answer how and why questions.	
Materials	I can describe and make comparisons between materials. I can talk about the changes to materials that I notice.		I can experiment with making changes to materials.		I can ask and answer 'how' and 'why' questions, such as how things happened and how things work. I can classify objects according to their properties.	
Forces, Movement and Sound	I can explore how to change sounds. I can describe changes in sounds such as loud and quiet, tempo - fast or slow.		I notice links between cause and effect as I explore changes such as speed, direction, shape or magnetism.		I understand some important processes and changes in the natural world around them.	
Living Things— Animals, Humans, Plants /conservation	I can use the correct basic scientific vocabulary to describe parts of plants and animals.		I can talk about what plants and animals need to survive and grow healthily.		I make close observations of animals & plants in the natural world. I make comparisons and identify similarities and differences. I understand through books and observations that animals change, and I explain a range of lifecycles and habitats	
Vocabulary	Stem, leaf, root, petal, flower, body, legs, arms, head, hands, feet, paws, eyes, mouth, nose, ears, seasons, autumn, spring, summer, winter, weather, change, grow		Lifecycle, grow, change, healthy, sunshine, water, shelter, care, observe, predict, experiment		Lifecycle, grow, change, healthy, sunshine, water, shelter, care, observe, predict, experiment, classify, properties, order, sequence	
Scientific Enquiry Types **Golden Threads**						
Characteristics of Effective Learning (Disciplinary Knowledge – skills we need to learn)	**Playing and Exploring** – Children investigate and experience things and have a go. Children who actively participate in their own play develop a larger store of information and experience to draw on which positively supports their learning. **Active Learning** – Children concentrate and keep on trying if their encounter difficulties. They are proud of their own achievements. For children to develop into self-regulating lifelong learners they are requires to take ownership, accept challenges and learn persistence. **Creating and thinking critically** - Children develop their own ideas and make links between these ideas. They think flexibly and rationally, drawing on previous experiences which help them to solve problems and reach conclusions.					
Protected Characteristics						

SCIENCE - Curriculum Overview

Reception	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
General Theme	All About Me!	Our Wonderful World	Ticket to Ride	Come Outside	Our Heroes	Fun at the Seaside
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Enhanced Provision	Curiosity cube—conkers, pine cones, leaves	Animals Different homes Books on habi-tats	Floating and sinking Make a toy town for the bus to go through construction—exploring materials Junk model – make a veh cle—exploring materials Observation cube leaves, sticks, grass, soil Flowers	Dinosaur egg hatching Frozen dinosaurs Dinosaur fossils stones and make own using clay and art straws. Broad bean planting us-ing different materials, e.g; sand, soil, cotton wool, paper towels.	Design, make and test your own boat using different materials. Which boats floated/ sank. Which boats were waterproof? Using variety of DT mate-rials to construct boats	Seaside resources shells, sand, seaweed, water Butterfly house, cocoons Life cycle
Topic Time DEAL	Mirrors—reflection Seasonal change—Autumn	Explore habitats Explore homes Categorise animals	TIR as naughty bus. The things I've seen etc.. what my job is… I'm not just a toy…I am im-portant because… Floating and sinking ex-periment	Frozen dinosaurs—changes—solid to liq-uid—states of matter, materials Dino hatching egg What do Dinosaurs eat? Classify Dinosaurs , carni-vores, herbivores, omni-vores.	TIR as Tom. The Pirates are coming! Tom does not know the difference between a boat and a ship. Explore different boats and ships. Create a class pirate ship using large scale con-struction and materials for flags.	Investigate seasons Exploring butterfly lifecy-cle Hatching butterflies and releasing them Exploring habitat Seaside exploration
Experiential Opportunities	Park visit – tree study Asda shop visit Autumn Trail Harvest Tine	Guy Fawkes / Bonfire Night Diwali Hanukkah	Bus ride to Hazel Grove Valentine's Day	Planting seeds Lent Easter Time Weather experiments Mother's Day Easter Egg Hunt Park visit – observational	Post a wanted sign Food tasking Walk to the park – ob-serve changes Pirate Day Map work – find the treasure	Ice cream at the park Beach Trip Fossil Hunting, looking for and at sea creatures and objects left behind on the sand such as seaweed, shells, rocks and pebbles RNLI

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YEAR 1	AUTUMN 1 Animals Including Humans (HUMAN ELEMENT)	AUTUMN 2 and SUMMER 2 Everyday materials	SPRING 1 Animals Including Humans (ANIMAL ELEMENT)	SPRING 2 Plants	SUMMER 1 Living Things and their Habitats (Seasonal Changes)
Enquiry Question	What is a human made of?	Why are party hats made of paper?	Are bats a type of bird?	What are plants and how do they live?	What happens when seasons change?
Substantive Concepts	Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body. Although we often use our fingers and hands to feel objects, the children should understand that we can feel with many parts of our body. Can play and lead 'Simon says' During PE lessons, can follow instructions involving parts of the body Can label parts of the body on pictures and diagrams Can explore objects using different senses	All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different 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.	Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals Can name a range of animals which includes animals from each of the vertebrate groups Can describe the key features of these named animals Can label key features on a picture/ diagram Can write descriptively about an animal Can write a What am I? riddle about an animal Can describe what a range of animals eat	Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring. Can name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green	In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people. Can name the four seasons and identify when in the year they occur Can describe weather in different seasons over a year Can describe days as being longer (in time) in the summer and shorter in the winter Can describe other features that change through the year
Key Vocabulary	parts of the body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ear, tongue *Although we often use our fingers and hands to feel objects, the children should understand that we can feel with many parts of our body*	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	head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group	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	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length

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YEAR 1		Animals Incl Humans	Everyday materials	Animals Incl Humans	Plants	Living Things and their Habitats
Disciplinary Concepts	 Thinking and Investigating like a scientist	Make first-hand close observations of parts of the body e.g. hands, eyes. Can name body parts correctly when talking about measurements and comparisons e.g. “My arm is x straws long.” “My arm is x straws long and my leg is y straws long. My leg is longer than my arm.” “We both have hands, but his are bigger than mine.” “These people have brown eyes and these have blue.” 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?	Observe, investigate and describe the properties of different materials.	Use first-hand close observations to talk about different animals and make detailed drawings of animals and their features/ structures.	Plant seeds and grow a flower or plant, observing it grows and changes over time. Observe growth and change of the different plants in the school yard and in the local area while on visits to the junior site.	Go on walks in the local community; school yard, junior site, local park. Observe the weather, sky, temperature, trees and plants. Talk about what you can see, what the weather feels like, what the plants/trees look like. ·
	 Using equipment and measuring like a scientist	Compare two people: · By direct comparison and then taking measurements of parts of their body using non-standard units. ·Compare measurements between the different parts of their own body. Look for patterns between people e.g. Do people with big hands have big feet? ·Classify people according to their features.	Compare and group together a variety of everyday materials on the basis of their simple physical properties. Sort objects and materials using a range of properties Choose an appropriate method for testing an object for a particular property	Can sort and group animal figures/photographs according to similarities and differences ·Can use simple charts etc. to identify unknown animals.	Can collect information on features of the flower/ plant that change during the year. Can sort and group parts of plants using similarities and differences ·Can use simple charts etc. to identify plants	Use the evidence gathered to describe the general types of weather and changes in day length over the seasons.
	 Presenting information and making links like a scientist	Record findings in writing/prepared tables.	Label a picture or diagram of an object made from different materials.	Can create a drawing of an imaginary animal labelling its key features	Take photos to document changes and growth.	Make a weather forecast video, write seasonal poetry, create seasonal artwork.
	 Learning and explaining like a scientist	Can talk about their findings from investigations using appropriate vocabulary e.g. “My fingers are much better at feeling than my toes” “We found that the crisps all taste the same.”	Use their test evidence to answer the questions about properties e.g. “Which cloth is the most absorbent?”	Can use secondary resources to find out what animals eat, including information books, talking to experts e.g. pet owners, zookeepers etc.	Use photographs and information books to talk about how plants change over time.	Use their evidence to describe some other features of their surroundings, e.g. themselves, animals, plants that change over the seasons
Experiential Knowledge **Our Church** **Our Community** **Visit / Place / Person**			Pirate boat building day.	Minibeast hunt at the juniors	Plant walk in the local area.	
Protected Characteristics		Disability, race.	Sex			Religion, belief

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YEAR 2	Animals Incl Humans	Living Things and their Habitats	Materials (incl Rocks and Fossils)	Plants
Enquiry Question	What do living things need to survive?	How is an animal adapted to its habitat?	What would be a good material for a boat?	What do plants need to germinate and grow?
Substantive Concepts	Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. · Can describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages ·Can state the basic needs of animals, including humans, for survival · Can state the importance for humans of exercise, eating the right amounts of different types of food, and hygiene · Can name foods in each section of the Eatwell Guide	All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.	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 -Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use -Can label a picture or diagram of an object made from different materials -For a given object can identify wha properties a suitable material needs to have -Whilst changing the shape of an object can describe the action used -Can use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot -Can recognise that a material may come in different forms which have different properties	Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy. -Can describe how plants that they have grown from seeds and bulbs have developed over time -Can identify plants that grew well in different conditions

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YEAR 2		Animals Incl Humans	Living Things and their Habitats	Materials (incl Rocks and Fossils)	Plants
Substantive Concepts			· Can find a range of items outside that are living, dead and never lived · Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied · Can talk about how the features of these animals and plants make them suitable to the habitat · Can talk about what the animals eat in a habitat and how the plants provide shelter for them · Can construct a food chain that starts with a plant and has the arrows pointing in the correct direction		
Key Vocabulary		offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/hen, kitten/cat, caterpillar/butterfly), survive, survival, water food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-habitats studied	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	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling
Disciplinary Skills & Enquiry Types	Thinking and Investigating like a scientist	Can measure/observe how animals, including humans, grow. Investigate whether older year two children can run faster than the younger year one children.		Observe and manipulate a range of materials. Talk about their ideas about why the key properties of a material is suitable or not to use for a particular purpose. Investigate which materials would be good for a boat?	-Observe bulbs and seeds over time. -Investigate similarities and difference between bulbs and seeds, and identify plants that grew well in different conditions.
	Using equipment and measuring like a scientist	Can describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child. Sort Food packaging to investigate healthy/not healthy food. Record running times for a year one/two boy/girl.	Can sort pictures/photos into living, dead and never lived.	-Can sort materials using a range of properties -Can explain using the key properties why a material is suitable or not suitable for a purpose Can begin to choose an appropriate method for testing a material for a particular property.	Nurture seeds and bulbs into mature plants by following instructions. (indoors) and compare seeds and bulbs that have been planted outdoors.

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YEAR 2		Animals Incl Humans	Living Things and their Habitats	Materials (incl Rocks and Fossils)	Plants
	 Presenting information and making links like a scientist	-Show what they know about looking after a baby/animal by creating a parenting/pet owners' guide ·Explain how development and health might be affected by differing conditions and needs being met/not met.	-Can give key features that mean the animal or plant is suited to its micro-habitat ·Using a food chain can explain what animals eat -Can 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; the sea weed we found on the beach can not live in our pond because it is not salt.	-The children record their observations using photographs, drawings, labelled diagrams or in writing. -Classify using simple prepared tables.	Photograph seeds and bulbs at different stages of germination, Record information as a pictogram or prepared table.
	 Learning and explaining like a scientist	Information books, food packaging, sample of boys/girls from year one/ two, prepared tables to record		Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?	Use test evidence to identify which seeds and bulbs matured into plants.
Scientific equipment/ techniques used		Stop watches, information books,	Photos, information books		Information books, instructions, time lapse videos, prepared table/pictograms, seeds, bulbs, propagator, soil, watering can, Ipad.
Experiential Knowledge **Our Church** **Our Community** **Visit / Place / Person**		Career day, road safety, harvest festival, sporting events.	Visit to the Juniors, Rockpool Experience, Kenya Visit, Production.	Fire Brigade Visit, Forest School	Growing plants, outdoor artwork at the juniors.
Protected Characteristics		All	Sex, pregnancy, age.	Disability	

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Year 3	Animals including humans	Plants	Rocks	Light	Forces
Enquiry Question	What would happen if we didn't eat? Human versus insects- who's built for speed?	How do plants power our lives? What do all plants have in common?	Can all rock types be used for building houses? Which soil type is most successful to grow seeds into plants?	Will taller members of the class have longer shadows? Are shadows most visible at night?	Are all metals magnetic? Are only metals magnetic?
Substantive Concepts	-Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food – they get nutrition from what they eat. -Identify that humans and some other animals have skeletons and muscles for support, protection and movement. -Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. -Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support -Can name the nutrients found in food -Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients - Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection -Can describe how muscles and joints help them to move	-Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. -Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. -Investigate the way in which water is transported within plants. -Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. -Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	-Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. -Describe in simple terms how fossils are formed when things that have lived are trapped within rock. -Recognise that soils are made from rocks and organic matter. -Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. -Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.	-Recognise that they need light in order to see things, and that dark is the absence of light. -Notice that light is reflected from surfaces. -Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. -Recognise that shadows are formed when the light from a light source is blocked by an opaque object. -Find patterns in the way that the size of shadows change. We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. -The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. -Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.	-Compare how things move on different surfaces. -Notice that some forces need contact between two objects, but magnetic forces can act at a distance. -Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. -Describe magnets as having two poles. -Predict whether two magnets will attract or repel each other, depending on which poles are facing. -A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. -A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles are brought together they will push away from each other – repel. If two unlike poles are brought together they will attract.

SCIENCE - Curriculum Overview

Year 3		Animals including humans	Plants	Rocks	Light	Forces
			-Can explain the function of the parts of a flowering plant -Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination -Can give different methods of pollination and seed dispersal, including examples			
Key Vocabulary (On Knowledge Organiser)		Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, soil, types of soil (e.g. peaty, sandy, chalk, clay)	light, light source, Sun, sunlight, dangerous	Pull Push Friction Surface Magnet Magnetic field Pole Attract Repel, Compass
Disciplinary Skills & Enquiry Types	Thinking and investigating like a scientist	Plan a daily diet to contain a good balance of nutrients. 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?	Observe what happens to plants over time when the leaves or roots are removed. Observe the effect of putting cut white carnations or celery in coloured water. 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. Spot flowers, seeds, berries and fruits outside throughout the year. Observe seeds being blown from the trees e.g. sycamore seeds	Observe rocks and soils closely. Devise a test to investigate the hardness of a range of rocks. Observe how rocks change over time e.g. gravestones or old building. Devise a test to investigate the water retention of soils. Observe how soil can be separated through sedimentation. Research the work of Mary Anning.	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.	Classify materials according to whether they are magnetic. Explore the way that magnets behave in relation to each other.

SCIENCE - Curriculum Overview

	 Using equipment and measuring like a scientist	Use food labels to explore the nutritional content of a range of food items. Investigate patterns asking questions such as: Can people with longer legs run faster?		Devise a test to investigate how much water different rocks absorb. Devise a test to see in which soil plants thrive most.	Explore how shadows vary as the distance between a light source and an object or surface is changed.	Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. Explore what materials are attracted to a magnet. Use a marked magnet to find the unmarked poles on other types of magnets Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. Devise an investigation to test the strength of magnets.
	 Presenting information and making links like a scientist	Classify food in a range of ways. Enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Compare, contrast and classify skeletons of different animals.	Classify seeds in a range of ways, including by how they are dispersed. Create a new species of flowering plant.	Classify rocks in a range of ways, based on their appearance. Classify soils in a range of ways based on their appearance.	Choose suitable materials to make shadow puppets. Create artwork using shadows.	Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface Can use classification evidence to identify that some metals, but not all, are magnetic
	 Learning and explaining like a scientist	Research the parts and functions of the skeleton. Explore the nutrients contained in fast food.	Research different types of seed dispersal.	Research using secondary sources how fossils are formed.	Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. Can clearly explain, giving examples, that objects are not visible in complete darkness Can describe and demonstrate how shadows are formed by blocking light Can describe, demonstrate and make predictions about patterns in how shadows vary	Can use their results to describe how objects move on different surfaces Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles Can use test data to rank magnets

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Year 3	Animals including humans	Plants	Rocks	Light	Forces
				Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change	
Scientific equipment/ techniques used	-Drawing tables -Measuring length using rulers, metre sticks and trundle wheels - reading data accurately (in line with ARES for maths data handling expectations)	-Measuring length using rulers, metre sticks and trundle wheels -Using tools for magnification - Verbalise (or write) an explanation of what they have observed - Clear drawing and labelling of diagrams using pencil or computing equipment		Torches Puppets Projector screens Light boxes	Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface Can use classification evidence to identify that some metals, but not all, are magnetic
Experiential Knowledge Our Church Our Community Visits / Places / People	-Visit from a dental hygienist	-Local area walk -Wild walk in the grounds	- Local area walk -Wild walk in the grounds		- Park trip – properties of playground equipment?
Protected Characteristics					

SCIENCE - Curriculum Overview

Year 4	Electricity	Animals Including Humans	States of Matter	Sound	Living Things and their Habitats
Enquiry Question	Without electricity, would we survive in the present day? Which appliance is most important?	Is the digestive system the most important human system? Are humans designed to digest all food groups?	Solids are stronger than liquid or gas… Without the water cycle, would Earth survive?	If a sound is inaudible by human ears… is it still a sound? Are percussion instruments always louder than wind instruments?	Do the features of amphibians make them the most resilient creatures?
Substantive Concepts	Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors. Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.	Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey. Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Living things can be classified as producers, predators and prey according to their place in the food chain.	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. A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid.	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. Sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds	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. Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.

SCIENCE - Curriculum Overview

Year 4		Electricity	Animals Including Humans	States of Matter	Sound	Living Things and their Habitats
Substantive Concepts				Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.		
Key Vocabulary (On Knowledge Organiser)		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 **N.B.** Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Y6.	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate
Disciplinary Skills & Enquiry Types	Thinking and Investigating like a scientist 	Classify the materials that were suitable/not suitable for wires.	Research the function of the parts of the digestive system. Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. Use food chains to identify producers, predators and prey within a habitat. Use secondary sources to identify animals in a habitat and find out what they eat.	Observe closely and classify a range of solids. Observe closely and classify a range of liquids Classify materials according to whether they are solids, liquids and gases. Observe a range of materials melting e.g. ice, chocolate and butter. Use secondary sources to find out about the water cycle.	Classify sound sources.	Observe plants and animals in different habitats throughout the year. Compare and contrast the living things observed. Classify living things found in different habitats based on their features. Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. Use secondary sources to find out about how environments may naturally change. Use secondary sources to find out about human impact, both positive and negative, on environments.

SCIENCE - Curriculum Overview

Year 4		Electricity	Animals Including Humans	States of Matter	Sound	Living Things and their Habitats
Disciplinary Skills & Enquiry Types	 Using equipment and measuring like a scientist	Construct a range of circuits. Explore which materials can be used instead of wires to make a circuit. 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. Make circuits that can be controlled as part of a DT project. Can incorporate a switch into a circuit to turn it on and off Can connect a range of different switches identifying the parts that are insulators and conductors Can add a circuit with a switch to a DT project and can demonstrate how it works		-Can measure temperatures using a thermometer -Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind -Investigate how to melt ice more quickly. -Observe the changes when making rocky road cakes or ice-cream. -Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate. -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	Explore making sounds with a range of objects, such as musical instruments and other household objects. 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.	
	 Presenting information and making links like a scientist	Can make electric circuits Can control a circuit using a switch	Can record the teeth in their mouth (make a dental record) Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part Can create food chains based on research	Can create a concept map, including arrows linking the key vocabulary Can give reasons to justify why something is a solid liquid or gas Can give examples of things that melt/freeze and how their melting points vary From their observations, can give the melting points of some materials Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet	-Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it -Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder -Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases -Can demonstrate how to increase or decrease pitch and volume using musical instruments or other objects -Can use data to identify patterns in pitch and volume	Use classification keys to name unknown living things. Create a simple identification key based on observable features. Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.) Can use classification keys to identify unknown plants and animals

SCIENCE - Curriculum Overview

Year 4		Electricity	Animals Including Humans	States of Matter	Sound	Living Things and their Habitats
Disciplinary Skills & Enquiry Types	Learning and explaining like a scientist 	Can name the components in a circuit Can name some metals that are conductors Can name materials that are insulators Can communicate structures of circuits using drawings which show how the components are connected Use classification evidence to identify that metals are good conductors and non-metals are insulators Can give reasons for choice of materials for making different parts of a switch Can describe how their switch works	Create a model of the digestive system using household objects. Can explain the role of the different types of teeth Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores	Can name properties of solids, liquids and gases Can give everyday examples of melting and freezing Can give everyday examples of evaporation and condensation Can describe the water cycle Using their data, can explain what affects how quickly a solid melts Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup From their data, can explain how to speed up or slow down evaporation	Can name sound sources and state that sounds are produced by the vibration of the object Can state that sounds travel through different mediums such as air, water, metal Can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium	Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter
Scientific equipment/ techniques used		Elements for circuits: Wires Cells Switches Buzzers Bulbs Motors Various materials to explore conduction Venn diagrams Classification keys	Classification Exploring models and diagrams	Thermometer Petri Dishes	Range of instrument Tuning forks Decibel readers	Classification keys Venn Diagrams
Experiential Knowledge Our Church Our Community Visits / Places / People		MoSI trip	MoSI trip		Orchestra? Class wide music lessons from Stockport music service	Explore school grounds/ forest school/ gardens Park trip
Protected Characteristics						

SCIENCE - Curriculum Overview

Year 5	Properties and Changes of Materials	Forces	Earth and Space	Lifecycles (Living things and their habitats)	Animals Including Humans
Enquiry Question	How do the properties of materials affect how we use them in	How do forces affect the way objects move or stay still?	How do the Earth, Moon, and Sun interact to create the world we live in?	Why are lifecycles important for the survival of species?	How do animals, including humans, grow, develop, and change over time?
Substantive Concepts	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filter-	A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines. · Can demonstrate the effect of gravity acting on an unsupported object · Can give examples of friction, water resistance and air resistance · Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical. - 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.	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. As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.	When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found below: Statutory guidance on Physical health and mental wellbeing (primary and secondary). Other useful guidance includes: Joint briefing on teaching about puberty in KS2 from PHSE Association and Association for Science Education Briefing on human's development and reproduction in the Primary Curriculum from PHSE Association and Association for Science Education.

SCIENCE - Curriculum Overview

Year 5		Properties and Changes of Materials	Forces	Earth and Space	Lifecycles (Living things and their habitats)	Animals Including Humans
		· Can use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings · Can explain what dissolving means, giving examples · Can name equipment used for filtering and sieving · Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving · Can describe some simple reversible and non-reversible changes to materials, giving examples				
Key Vocabulary (On Knowledge Organiser)		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	Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings	Puberty – the vocabulary to describe sexual characteristics
Disciplinary Skills & Enquiry Types	Thinking and Investigating like a scientist	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. 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 Can group solids based on their observations when mixing them with water	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.	Make first-hand observations of how shadows caused by the Sun change through the day.	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 Use secondary sources to find out about pollination.	This unit is likely to be taught through direct instruction due to its sensitive nature, although children can carry out a research enquiry by asking an expert e.g. school nurse to provide answers to questions that have been filtered by the teacher Can present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to 'problem page questions

SCIENCE - Curriculum Overview

Year 5		Properties and Changes of Materials	Forces	Earth and Space	Lifecycles (Living things and their habitats)	Animals Including Humans
Disciplinary Skills & Enquiry Types	 Using equipment and measuring like a scientist	Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. 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. Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water	Explore how levers, pulleys and gears work. Make a product that involves a lever, pulley or gear. Create a timer that uses gravity to move a ball.	Can explain how a sundial works Make first-hand observations of how shadows caused by the Sun change through the day.	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. Dissect a flowering plant and observe the key components.	
	 Presenting information and making links like a scientist	Investigate rates of dissolving by carrying out comparative and fair test. 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? Can create a chart or table grouping/ comparing everyday materials by different properties	Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface the particles in the water, air or on the surface slow it down Can demonstrate clearly the effects of using levers, pulleys and gears	Can create a voice over for a video clip or animation Can show, using diagrams, the movement of the Earth and Moon Can explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model Can explain verbally, using a model, why we have time zone		
	Learning and explaining like a scientist 	-Investigate rates of dissolving by carrying out comparative and fair test. -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? -Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton). -Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose -Can explain the results from their investigations	Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	Can explain the movement of the Earth and Moon Can explain what causes day and night Can use the model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth Can demonstrate and explain verbally how day and night occur Can describe the arguments and evidence used by scientists in the past Research time zones.	Look for patterns between the size of an animal and its expected life span.	

SCIENCE - Curriculum Overview

Year 5	Properties and Changes of Materials	Forces	Earth and Space	Lifecycles (Living things and their habitats)	Animals Including Humans
Scientific equipment/ techniques used	Heat sources Sieves Measuring equipment Water sources Various liquids Goggles Lab coats	Newton meters Friction ramps Motors Cells	Light boxes Puppets Projectors/ screens	Dissecting equipment Seeds and plants Gardening equipment Soil	See PSHE guidance
Experiential Knowledge Our Church Our Community Visits / Places / People	Community room – cooking	Outdoor learning areas – para-chute drops/ aeroplane testing etc	Planetarium visit? TBC Link to Art – Peter Thorpe Homework – space projects/ moon diary Link to French – Les Planetes		
Protected Characteristics					All

SCIENCE - Curriculum Overview

Year 6	Animals Including Humans 'The Circulatory System'	Light	Evolution and Inheritance 'Charles Darwin and his Discoveries'	Living Things and their Habitats	Electricity
Enquiry Question	Is the heart the most important organ? Which of the human 'systems' is most vital?	How do we see things?	Would evolution have happened without key, catastrophic weather events on planet Earth? Did the whale evolve from a land mammal?	Could plants and animals ever be classified into the same broad group?	More battery power will increase the brightness of the bulb… More bulbs within a circuit will dilute the brightness
Substantive Concepts	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • Describe the ways in which nutrients and water are transported within animals, including humans. The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. This content is also included	• 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. Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object. Can describe, with diagrams or models as appropriate, how light travels in straight lines either from sources or reflected from other objects into our eyes • Can describe, with diagrams or models as appropriate, how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited	• 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. Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.	• 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. Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams. • Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages • Can draw circuit diagrams of a range of simple series circuits using recognised symbols

SCIENCE - Curriculum Overview

Year 6		Animals inc. Humans	Light	Evolution and Inheritance '	Living Things and their Habitats	Electricity
Key Vocabulary (On Knowledge Organiser)		Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, life-style	As for Year 3 - Light, plus straight lines, light rays	offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils, evolve, evolution	vertebrates, fish, amphibians, reptiles, birds, mammals, inverte-brates, warm-blooded, cold-blooded, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage
Disciplinary Skills & Enquiry Types	Thinking and Investigating like a scientist	Carry out a range of pulse rate investigations: 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.		Design a new plant or animal to live in a particular habitat. Use secondary sources to find out about how the population of pep-pered 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 off-spring and explore this process by considering the artificial breeding of animals or plants e.g. dogs. Compare the ideas of Charles Dar-win and Alfred Wallace on evolu-tion. Research the work of Mary Anning and how this provided evidence of evolution.	Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. Use first-hand observation to iden-tify characteristics shared by the animals in a group. Use secondary sources to research the characteristics of animals that belong to a group. Create an imaginary animal which has features from one or more groups.	Can devise ways to measure brightness of bulbs, speed of mo-tors, volume of a buzzer during a fair test
	Using equipment and measuring like a scientist	Fair/ comparative test – effect of different activities on my pulse rate 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)	Explore different ways to demon-strate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shin-ing 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		Classify plants and animals, pre-senting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys. Can use classification materials to identify unknown plants and ani-mals Can create classification keys for plants and animals	Make circuits to solve particular problems, such as a quiet and a loud burglar alarm. Carry out fair tests exploring changes in circuits. Make circuits that can be con-trolled as part of a DT project. Can incorporate a switch into a circuit to turn it on and off Can change cells and components in a circuit to achieve a specific effect

SCIENCE - Curriculum Overview

Year 6		Animals inc. Humans	Light	Evolution and Inheritance '	Living Things and their Habitats	Electricity
Disciplinary Skills & Enquiry Types	Presenting information and making links like a scientist 	Create a role play model for the circulatory system. Use the role play model to explain the main parts of the circulatory system and their role Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do	Can predict and explain, with diagrams or models as appropriate, how the path of light rays can be directed by reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope Can predict and explain, with diagrams or models as appropriate, how the shape of shadows can be varied	Can give examples of how plants and animals are suited to an environment Can give examples of how an animal or plant has evolved over time e.g. penguin, peppered moth Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity.	Use information about the characteristics of an unknown animal or plant to assign it to a group.	Can communicate structures of circuits using circuit diagrams with recognised symbols Can predict results and answer questions by drawing on evidence gathered
	Learning and explaining like a scientist 	Can use subject knowledge about the heart whilst writing conclusions for investigations Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart	Can explain how evidence from enquiries shows that light travels in straight lines	Can explain the process of evolution	Can give a number of characteristics that explain why an animal belongs to a particular group	Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightness's or make a motor go faster or slower.
Scientific equipment/ techniques used		Pulse rate monitor Stop Watch Graphs and Charts	Mirrors Glass Prisms Torches Periscopes	Sketches/ notation	Classification Keys Venn diagrams Charts/ graphs	Circuit components Wires Bulbs Cells Switches Motors
Experiential Knowledge Our Church Our Community Visits / Places / People		Make clay hearts	Shadow puppet show	Evolution workshop Deal – survival of the fitness	School outdoor areas – forest school/ gardens Local environment walk	Making a fairground ride
Protected Characteristics		Age Disability		Disability Race Pregnancy & maternity		Disability (accessibility for fairground ride DT)