R eaching the highest possible outcomes for children

A ccepting and embracing our differences

E veryone thriving in a secure, safe and happy environment

B elonging to our community and being a good citizen

U nderstanding that education is a precious gift

R especting ourselves and others by setting high standards

N ever giving up- learning from our mistakes

Science at Raeburn Primary School

Intent			
High Expectations	**Modelling**	**Vocabulary**	**Inclusion**
From our youngest children at Little Owls to the oldest members of our school community, we encourage everyone to explore the awe and wonder of the world around them and to ask questions about what, how, when, where and who? All children are encouraged to become independent learners in exploring possible answers for their scientific based questions. At Raeburn we aim for children's learning to be deep and purposeful, when this is occurring then children's long-term memory will be in action. High quality science lessons ensure that our learners at Raeburn are engaged, inspired and challenged so that they reach their learning potential.	Teachers engage, include and inspire all of their learners in science lessons. In order to open children up to the awe, wonder and phenomena of many different scientific concepts; teachers hold the key. Raeburn staff motivate learners as they introduce, expose and model to children the practical world of science. In each science lesson children 'work like a scientist' and this may be in an investigation or applying one of the 'scientific enquiry' approaches, to their learning.	Children will develop their scientific knowledge and understanding as they use topic specific vocabulary in both oral and recorded aspects of each science lesson. Through sharing their ideas and questions about the world around them, children can apply and understand the meaning of the new vocabulary as they work scientifically in their lessons.	. All children are expected to take part in the lesson through scaffolded support or adapted teaching.Some children may need additional resources or adult support. If a child has not achieved their potential in the lesson then this is identified and staff use 'post it time' to rapidly address any misconceptions or allow the child more time to develop their understanding, this may be through through the use of the scientific resources within the classroom, to support and close any gaps in knowledge and skills.
Knowledge and concepts	**Skills**	**British Values**	**Cultural Capital**
All children will work as scientists as they learn a variety of concepts, knowledge and skills from the disciplines of Biology, Chemistry and Physics. Children will be exposed to the range of scientific enquiry approaches. As they journey through Raeburn, children will decide which approach may be needed to answer or explore an investigative question.	All children will have opportunities to explore ideas and questions by working scientifically. They will combine prior knowledge, new knowledge and the working scientifically skills through an enquiry based approach.	British Values are integral in all areas of our curriculum. Each classroom has a display and when elements of British Values are addressed in curriculum areas, these will be recorded on the display and outlined with children. **Democracy** Children will listen to others and take the views and opinions of others into account Take turns and follow instructions from others **The Rule of Law**	Throughout Raeburn children will learn about a founder scientist and a contemporary one, upon whose shoulders they stand. This will encourage our learners to be aware and to be inspired by a diverse range of 'real life' scientists.

Children will learn about a diverse range of Scientists both contemporary and 'founder' scientists.		Understand the importance of safety rules when working scientifically. Know that there are consequences if rules are not followed. **Individual Liberty** Make choices when planning an investigation. Respect that others may have different points of view about where to start or from their own conclusions. **Tolerence** Religious beliefs can compete with scientific understanding **Mutual Respect** Work as a team Discuss findings Offer support and advice to others	

Implementation		
Curriculum(concepts, knowledge and skills)	**Reading across the curriculum**	**Vocabulary**
Across Raeburn, all year groups will follow progressive science planning for each unit, which has been created to include pre-assessment tasks, prior learning knowledge/experiences and assessment opportunities and monitoring or progress. Staff use the PLAN matrices, for Knowledge and Skills. These ensure that the Learning Objectives from the National Curriculum are being taught Teachers also use Explorify to revisit prior learning or to address any misconceptions or gaps in children's knowledge and experiences. high-quality Science education should engage, inspire and challenge pupils.	Stories are used as a hook/link to the knowledge, skills and concepts of our science curriculum. In Science, each year group has a selection of stories to engage the children in their learning. These stories will help to develop questions and imagination. Our expectation for Science is that reading will be visible in every classroom to help enhance the learning experience and provide further opportunities for research. .	The environment is a powerful tool to enable children to 'work scientifically'. In each classroom the scientific language needed for each specific topic will be displayed. This is referred to, added to and used throughout and beyond the topic. Children are expected to use the vocabulary, for the specific topic, when they are working collaboratively to share their ideas, explanations, evaluations and conclusions.

Inclusion	Assessment	CPD
We have high expectations of all children and expect them to make progress and access lessons. We use adaptive teaching and scaffolding to support learners.	AFL strategies and principles underpin everything we do. Throughout each topic children will have the opportunity to demonstrate their knowledge and skills through at least one investigation and where suitable a topic task, these are through the topic not necessarily at the end. Sonar is used at the end of each term to make a judgement of pupil attainment	PLAN STEM National College PSST Feedback from SIA Deep Dive Subject leader support. Training needs are reflective of monitoring / staff CPD meetings
Monitoring	**Whole School/Parental involvement**	**Cultural Capital**
Subject leader tracks the learning journey of 1 child per class across the school. Monitoring also includes: pupil voice,, staff voice, book looks, peer-peer mentoring and CPD. Subject leaders have an opportunity to regularly meet with SLT regarding their subject. SIA Deep Dive took place in October 2022 and a LA inspection in December 2022..	Whole school science Investigation Days introduced and followed up with whole school assemblies. Children share experiences and celebrate their achievements. This is a great opportunity to enhance children's cultural capital as they celebrate founding and modern scientists. Each half term a homework will be a science task. At least one half termly sharing of books and classwork through open classrooms or parent/ teacher meetings	● Trips ● Visitors ● Inspirational figures ● Whole school science Celebrations/investigations
Whole school displays	All classrooms will have a visible and regularly updated working wall. It will include the current topic vocabulary, famous scientist, scientific enquiry images (the one which is the current foci will be highlighted) and appropriate resources. Subject Lead to ensure the whole school display is updated regularly. Photographs of children WS across Raeburn will be added each half term.	

Impact			
Pupil Voice	**Evidence in Knowledge**	**Evidence in skills**	**Outcomes**

Evidence collected from pupil voice- Many children are eager to talk about their science lessons and what they have been experiencing. Children are confident to talk about what they enjoy in their lessons as well as what they would like more of, investigations! In the Early Years classrooms children have confidently demonstrated and chatted about their 'Investigation Station'. .	In each class, each child will have a Science book which shows the learning journey. Throughout each unit there will be drawings, diagrams, investigations, photographs and research. Good examples of work can be added to working walls and the whole school science display. Theme planning grids ensure coverage and progression in all skills relating to science. The use of 'sticky-time' in all lessons ensures that knowledge is embedded.	Children are able to understand and correctly utilise subject specific vocabulary. Children work together and independently, with confidence. Children can combine their knowledge and working scientifically skills through enquiry-based approaches to learning. They can use these skills to enhance but also unlock new knowledge.	Children make good progress from their starting points across the curriculum. Children talk confidently about their learning. Children feel safe, calm and happy. Children will continue to develop their natural curiosity for the world around them. Children will begin working scientifically with support and then look to use those skills more independently as they progress on their scientific learning journey. Most children will become aware of a diverse range of scientists. All children will take part in learning opportunities that teach the specific disciplines of Biology, Chemistry and Physics. All children will have access to knowledge and skills that will prepare them for Science in secondary school.

Long Term Plan

Science long term plan 2022-23

Year Group	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Little Owls	**Autumn**		**Spring**		**Summer**	
Investigations	What's inside the bottle? Observe Why does this stick? Magnets What has happened to the water? Ice		Growing How can I help my cress seeds to grow? Plants		Are we all the same size? Will I grow before the holidays? Observing change	
F2	Ourselves/Autumn Preparing for Winter		Spring		Summer	
Investigations	Observe ice melting or ice in the outdoor area Observe physical changes outside linked to Autumn		What happens in Spring? - plant and animal observations Observe physical changes outside linked to Spring		What happens in summer? Observe physical changes outside linked to Summer Parts of a plant	
Year 1	Seasonal change Autumn and Winter Everyday materials		Body parts and senses	Plants Spring	Seasonal Change Summer	Animals including humans
Investigations	Which material is the most waterproof for the Jolly Postman's bag?		Can they identify objects using their senses?	What does a plant need to grow?	Does the temperature change throughout the four seasons?	Can they identify rainforest animals and compare them based on their speed and what they eat?

Year 2	Animals inc humans	All living things and their habitats	Uses of everyday materials	Animals inc humans	Plants	All living things and their habitats
Investigations	-Why is mould growing so quickly? -How do I feel after exercising?	-It is alive or dead? -What will happen to the hungry polar bear?	-How far can I stretch a Curly wurly? -Can I bend it?	How much has the baby grown?	-What do plants need to grow?	-Do all minibeasts live in the same habitat?
Year 3	Light	Forces (friction)	Forces (magnets)	Sound	Plants	Animals including humans
Investigations	- Changing shadows - Which surfaces reflect light?	- cars travelling on different surfaces	- magnetic/non- magnetic sorting	- insulating sound	- best conditions for growing	- leg length compared to distance of jumps
Year 4	Rocks and Soil		Teeth and Digestion	States of Matter Water Cycle	Electricity	Living Things
Investigations	What purposes do rocks have? Which rocks are porous?		Can you explain the functions of the parts of the digestive system? What is tooth decay?	What Makes Materials Change State? Do Gases Weigh Anything?	Which materials can electricity pass through?	Classifying vertebrae and invertebrate animals
Year 5	Earth and Space		Properties and changes to materials	Living things and their habitats	Forces	Animals including humans
Investigations	Shadows - monitor throughout the day Moon Diary - Phases of the moon		Volcano eruption - mixtures (irreversible	Compare growth of plants (asexual/sexual)	Water resistance-changing surface area of clay	Human timeline (photographs)

			change)		Air resistance - parachutes	
Year 6	light	Electricity	All living things and their habitats	Evolution and Inheritance	Animals including humans	
Investigations	Does light travel in a straight line? Can we find the colours of the rainbow? How are shadows formed?	Do the number of components in a circuit affect the brightness/volume /speed of a lamp/buzzer/motor ?	What conditions are the best for growing mould?	How have Homo Sapiens evolved?	How does exercise affect our Heart Rate? How does the heart make sure blood is pumped around the whole body?	

Long term plan for coverage of Raeburn Primary Science Programme of Study

Understanding the world	
EYFS	• Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, usin wide vocabulary. • Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. • Talk about the differences between materials and changes they notice • Explore and talk about different forces they can feel. • Describe what they see, hear and feel whilst outside.

	• Recognise some environments that are different from the one in which they live. • Understand the effect of changing seasons on the natural world around them.
ELG	• - Explore the natural world around them, making observations and drawing pictures of animals and plants; • - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read class; • - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
Working scientifically	• Listen attentively and respond to what they hear with relevant questions. • Show an ability to follow instructions involving several ideas or actions. • Be confident to try new activities. • Use a range of small tools • Safely use and explore a variety of materials, tools and techniques. • Explore the natural world around them, making observations and drawing pictures of animals and plants • Participate in discussions, offering their own ideas, using recently introduced vocabulary. • Offer explanations for why things might happen • Express their ideas and feelings about their experiences. • Know some similarities and differences, drawing on their experiences.
Famous Scientists	
• David Bellamy ((Naturalist and Nature Documentary Broadcaster) • Elizabeth Garrett Anderson *1st British woman doctor*	

Science Progression Map

Vocab	All vocabulary linked to each topic can be found in the PLAN matrices in the shared area- under EYFS				
EYFS – Some suggested Linked Texts inc Traditional, songs and rhymes (Reading Across the Curriculum)					
Texts	***Animals*** • *Traditional stories and nursery rhymes* • The Ugly Duckling • Old MacDonald had a Farm *Other texts*	**Plants** *Traditional stories and nursery rhymes* • Jack and the Beanstalk • The Giant Turnip *Other texts*	**Humans** *Traditional stories and nursery rhymes* • Goldilocks and the Three Bears	**Materials/ seasonal change** *Traditional stories and nursery rhymes* • Gingerbread Man • Pat a Cake • Little Red Hen	**Light/sound** *Other texts* • We're Going on a Bear Hunt by Michael Rosen • Alfie Goes Camping by Shirley Hughes

	• The Very Hungry Caterpillar & The Mixed-Up Chameleon by Eric Carle • Counting Creatures & Monkey Puzzle by Julia Donaldson • Who is in the egg? by Alexandra Milton • The Odd Egg & Monkey and Me by Emily Gravett • Owl Babies by Martin Waddell • Baby Goz by Steve Weatherill Cock-A-Doodle-Moo by Bernard Most Brown Bear, Brown Bear, What Do You See? & Polar Bear, Polar Bear, What Do You Hear? by Bill Martin Jr • Wibbly Pig Picks a Pet by Mick Inkpen • Farmyard Hullabaloo by Giles Andreae & David Wojtowycz • Rosie's Walk by Pat Hutchins • Little Chick's First Day by Paula McBride	• Jim and the Beanstalk by Raymond Briggs • Titch by Pat Hutchins • Oliver's Vegetables by Alison Bartlett & Vivian French • We Planted a Pumpkin by Rob Ramsden	• How Do Your Senses Work? by Judy Tatchell • That's Not My Collection by Usborne • Once There Were Giants by Martin Waddell • Lost and Found by Oliver Jeffers • Shark in the Park by Nick Sharratt • One Day on our Blue Planet: In the Antarctic by Ella Bailey • Poles Apart by Jeanne Willis • Monkey with a Bright Blue Bottom by Steve Smallman • Walking through the Jungle by Julie Lacome • How many legs? by Kes Gray	*Traditional stories and nursery rhymes* • Rain, Rain Go Away • Rain on the Green Grass • It's Raining, It's Pouring • I Hear Thunder *Other texts* • Seasons by Anna Pang • Autumn is Here by Heidi Pross Gray • Spring is Here by Will Hillenbrand • One Springy Day by Nick Butterworth • WOW! It's Night-time by Tim Hopgood	• Can't You Sleep Little Bear by Martin Waddell • The Rabbit, the Dark and the Biscuit Tin by Nicola O'Byrne*Traditional stories and nursery rhymes* • The Wheels on the Bus • Old MacDonald had a Farm *Other texts* • Peace at Last by Jill Murphy • All Join In by Quentin Blake • Pip and Posy: The Friendly Snail by Camilla Reid • The Flute by Ken Wilson Max • Mr Brown can moo, can you? by Dr Seuss

	• Poo at the Zoo by Sarah Eason • Lucky Little Mouse by A H Benjamin • Dora's Egg by Julie Sykes • The Trouble with Tadpoles by Sam Godwin • Stellaluna by Janell Cannon • Moo, Baa, La La La! by Sandra Boynton				• Dinosaurs Roar by Henrietta Strickland • Barnyard Banter by Denise Fleming • Cats go … by Annie Horwood • Sheep in a Jeep by Nancy Shaw • Dogs go… by Annie Horwood

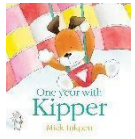
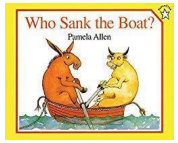
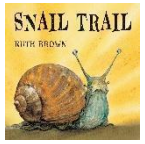
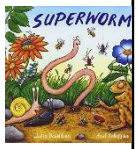
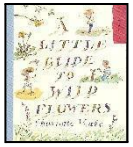
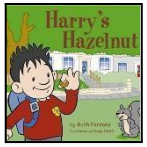
Year 1

Year 1 – ***Knowledge and Understanding***

	Seasonal Changes	Materials	Plants	Animals inc. Humans
Year 1	Observe changes across the four seasons. Observe and describe weather associated	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including	Identify & name a variety of common wild & garden plants, including deciduous & evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees.	Group animals according to what they eat Identify, name, draw & label the basic parts of the human body and say which part of the body is associated with each sense.

	with the seasons and how day length varies.	wood, plastic, glass, metal, water and rock. Describe the simple physical properties of a variety of everyday materials. Compare & group together a variety of everyday materials on the basis of their simple physical properties.		Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
Working Scientifically	·Ask simple questions and recognise that they can be answered in different ways (Year 1 focus) · Use simple equipment to observe closely (Year 1 focus) · Perform simple tests (Year 1 focus) · Identify and classify (Year 1 focus) · Use his/her observations and ideas to suggest answers to questions (Year 1 focus) · Gather and record data to help in answering questions (Year 1 focus)			
Famous scientists				

	Christopher Wren—Inventor of the rain gauge. **Jane Strachen**—Climate scientist	**Charles Macintosh**—Raincoat and waterproof materials **Zach Johnson**—Clothes made from recycled plastic bottles found in the ocean	**Alan Mitchell**—British forester who recorded tree growth. **Suzanne Simard**—professor of forest ecology	**Joan proctor**—zoologist and curator of reptiles **Dr Sandeun Lek Chailert**— Cre ator ofthe Elephant nature foun dation protecting elephants.
Vocab	**Plants** Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud **Animals** Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves **Senses** Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue **Materials** 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 **Seasons** Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length, monsoon, khareef, thunder storm			
Year 1 - Suggested Linked Texts (Reading Across the Curriculum)				
	Tree: Seasons Come, Seasons Go *(Patricia Hegarty and Britta Teckentrup)*	***The Great Paper Caper*** *(Oliver Jeffers)*	**RSPB: My First Book of Garden Birds** (Mike Unwin and Sarah Whittley)	***A Little Guide to Wild Flowers*** *(Charlotte Voake)*

	One Year with Kipper *(Mick Inkpen)* ***After the Storm*** *(Nick Butterworth)*   	***Who Sank the Boat*** *(Pamela Allen)* ***The Story of Cinderella*** *(Walt Disney)*   	**Snail Trail** (Ruth Brown) **Superworm** (Julia Donaldson & Axel Scheffler)   	***The Things That I LOVE about TREES*** *(Chris Butterworth)* ***Harry's Hazelnut*** *(Ruth Parsons)*   

Year 2

Year 2 – ***Knowledge and Understanding***

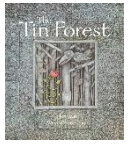
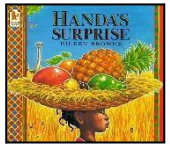
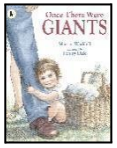
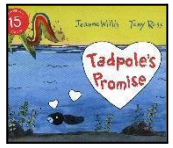
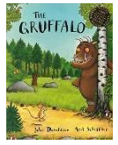
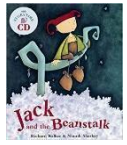
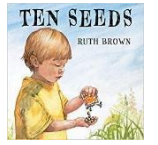
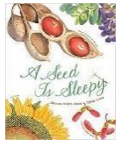
Year 2	**Materials**	**Plants**	**Animals inc. Humans**	**Living Things & their Habitats**

	Identify & compare the suitability of a variety of everyday materials, including wood, metal, plastics, glass, brick, rock, paper and cardboard for particular uses. Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Observe and describe how seeds and bulbs grow into mature plants. Describe how plants need water, light and a suitable temperature to grow and stay healthy, and describe the impact of changing these	Understand that animals, including humans, have offspring which grow into adults. Describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including micro-habitats

Working Scientifically	Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum (Year 2 focus) · Use simple equipment to observe closely including changes over time (Year 2 focus) · Perform simple comparative tests (Year 2 focus) · Identify, group and classify (Year 2 focus) · Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns (Year 2 focus) · Gather and record data to help in answering questions including from secondary sources of information (Year 2 focus)

Famous Scientists			
John McAdam —Road surfacing **Julie and Scott Brusaw** —Solar roads	**Marie Clark Taylor**—a botanist who studied the effects of light on plant growth. **Michael Way**—Botanist, sets up and runs plant conservation projects, seed banking	**Louis Pasteur**— developed the first vaccines **Katalin Kariko**—Covid vaccine development	**Evelyn Cheesman**— Entomologist and curator of insects **Dr Alexandra Harmon Threatt** — Entomologist and bee expert

Vocab	**Living things and habitats**	Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.
	Plants	As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy, germinate
	Animals and humans	Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)

Year 2 - Suggested Linked Texts (Reading Across the Curriculum)				
	The Tin Forest *(Helen Ward)* ***Traction Man*** *(Mini Grey)* ***Three Little Pigs*** *(Lesley Sims)*    	***Handa's Surprise*** *(Eileen Brown)* ***Once There Were Giants*** *(Martin Waddell and Penny Dale)* ***Tadpole's Promise*** *(Jeanne Willis and Tony Ross)*    	***The Gruffalo*** *(Julia Donaldson)* ***Meerkat Mail*** *(Emily Gravett)* ***No Place Like Home*** *(Jonathon Emmett)*    	***Jack and the Beanstalk*** *(Richard Walker)* ***Ten Seeds*** *(Ruth Brown)* **A Seed Is Sleepy** (Dianna Aston)   

Year 3

Year 3 – ***Knowledge and Understanding***

Year 3	**Light**	**Forces and Magnets**	**Sound**	**Plants**	**Animals inc. Humans**

Working	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 a solid object. Find patterns in the way that the	Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	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.	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. Invest the way in which water is transported within plants Explore the part of the flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	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 animals have skeletons and muscles for support, protection and movement.

Scientifically	size of shadows change.				

· Ask relevant questions and use different types of scientific enquiries to answer them

· Set up simple practical enquiries, comparative and fair tests

· Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

· Gather, record, classify and present data in a variety of ways to help in answering questions

· Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

· Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

· Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

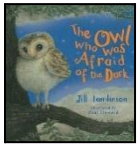
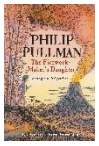
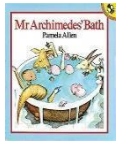
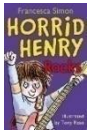
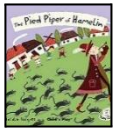
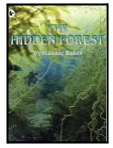
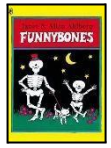
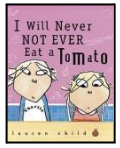
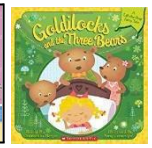
· Identify differences, similarities or changes related to simple scientific ideas and processes

· Use straightforward scientific evidence to answer questions or to support his/her findings

Famous Scientists				
James Clerk Maxwell (Visible and Invisible Waves of Light)	**William Gilbert** (Theories on Magnetism) **Andre Marie Ampere** (Founder of Electro-Magnetism)	**Aristotle** (Sound Waves) **Gailileo Galilei**	**Jan Ingenhousz** (Photosynthesis) **Joseph Banks** (Botanist)	**Adelle Davis** (20th Century Nutritionist) **Marie Curie** (Radiation / X-Rays)

			(Frequency and Pitch of Sound Waves) **Alexander Graham Bell** (Invented the Telephone)		

Vocab	Sound travel, pitch (high low)	**Plants**	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal	Sound, source, vibrate, vibration, volume, faint, loud, insulation
		Light	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	
		Forces and magnets	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	
		Rocks and soils	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	
		Animals and humans	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	
Year 3 - Suggested Linked Texts (Reading Across the Curriculum)				

The Owl Who Was Afraid of the Dark *(Jill Tomlinson)* ***The Dark*** *(Lemony Snicket)* ***The Firework-Maker's Daughter*** *(Philip Pullman)*   	***Mrs Armitage: Queen of the Road*** *(Quentin Blake)* ***Mr Archimedes' Bath*** *(Pamela Allen)*  	***Horrid Henry Rocks*** *(Francesca Simon)* ***Moonbird*** *(Joyce Dunbar)* ***The Pied Piper of Hamelin*** *(Natalia Vasquez)*   	***The Story of Frog Belly Rat Bone*** *(Timothy Basil Ering)* ***The Hidden Forest*** *(Jeannie Baker)* ***George and Flora's Secret Garden*** *(Jo Elworthy)*   	***Funnybones*** *(Janet and Allan Ahlberg)* ***I Will Never Not Ever Eat a Tomato*** *(Lauren Child)* ***Goldilocks and the Three Bears*** *(Samantha Berger)*   

Year 4

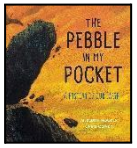
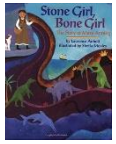
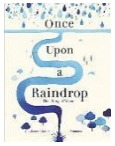
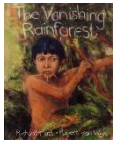
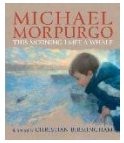
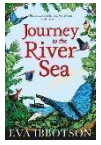
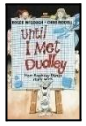
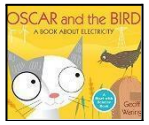
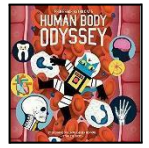
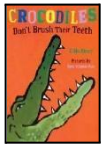
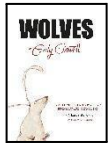
Year 4 – ***Knowledge and Understanding***

Year 4	Rocks	States of Matter	Living Things and their Habitats	Electricity	Animals inc. Humans

	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.	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. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	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.	Identify common appliances that run on electricity Construct a simple 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.	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.

Working Scientifically					
	Ask relevant questions and use different types of scientific enquiries to answer them · Set up simple practical enquiries, comparative and fair tests · Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers · Gather, record, classify and present data in a variety of ways to help in answering questions · Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables · Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions · Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions · Identify differences, similarities or changes related to simple scientific ideas and processes · Use straightforward scientific evidence to answer questions or to support his/her findings				
	Famous Scientists				
	Mary Anning (Discovery of Fossils) **Inge Lehmann** (Earth's Mantle)	**Anders Celcius** (Celcius Temperature Scale) **Daniel Fahrenheit**	**Cindy Looy** (Environmental Change and Extinction) **Jaques Cousteau** (Marine Biologist)	**Thomas Eddison** (First Working Lightbulb) **Joseph Swan** (Incadesecant Light Bulb)	**Ivan Pavlov** (Digestive System Mechanisms) **Joseph Lister** (Discovered Antiseptics)

		(Fahrenheit Temperature Scale / Invention of the Thermometer)			
Vocab	**Rocks** Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, peat, sandy/chalk/clay soil **Living things and habitats** Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate **Animals and humans** 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 **Electricity** Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol **Sound** Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation **States of matter** Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle			
Year 4 - Suggested Linked Texts (Reading Across the Curriculum)					

	The Pebble in My Pocket *(Meredith Hooper)* ***Stone Girl, Bone Girl*** *(Laurence Anholt)* ***The Street Beneath My Feet*** *(Charlotte Guillain & Yuval Zommer)*    	***Charlie and the Chocolate Factory*** *(Roald Dahl)* ***Once Upon a Raindrop: The Story of Water*** *(James Carter)* ***Sticks*** *(Diane Alber)*    	***The Vanishing Rainforest*** *(Richard Platt)* ***The Morning I Met a Whale*** *(Michael Morpurgo)* ***Journey to the River Sea*** *(Eva Ibbotson)*    	***Until I Met Dudley*** *(Roger McGough)* ***Oscar and the Bird: A Book about Electricity*** *(Geoff Waring)* ***Electrical Wizard: How Nikola Tesla Lit Up the World*** *(Elizabeth Rusch)*    	***Human Body Odyssey*** *(Werner Holzwarth)* ***Crocodiles Don't Brush Their Teeth*** *(Colin Fancy)* ***Wolves*** *(Emily Gravett)*   

Year 5

Year 5 – ***Knowledge and Understanding***

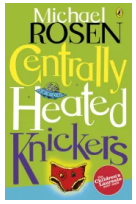
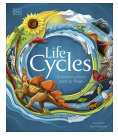
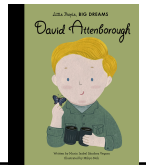
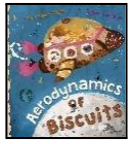
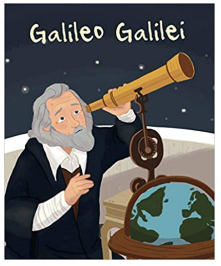
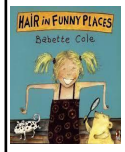
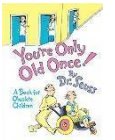
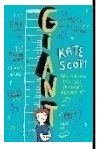
Year 5	Earth and Space	Materials	Living Things and their Habitats	Forces and magnets	Animals including humans
Working	Describe the movement of the Earth, and the other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and 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.	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. Recognise 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.	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.	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	Describe the changes as humans develop to old age

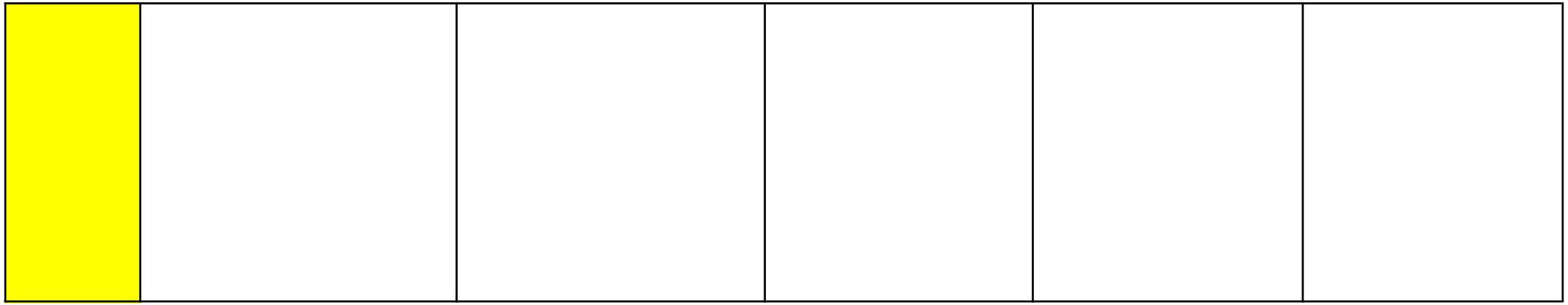
Scientifically		Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.			
	• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Use test results to make predictions to set up further comparative and fair tests • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identify scientific evidence that has been used to support or refute ideas or arguments				
	Famous Scientists				
	Claudius Ptolemy and Nicolaus Copernicus (Heliocentric vs Geocentric Universe)	**Spencer Silver,** **Arthur Fry and Alan Amron** (Post-It Notes) **Ruth Benerito**	**David Attenborough** (Naturalist and Nature Documentary Broadcaster)	**Galileo Galilei** (Gravity and Acceleration) **Isaac Newton** (Gravitation)	**Claudius Galen** **Leonardo Da Vinci** **Gabriele Fallopio** (Anatomy)

	Stephen Hawking Theoretical physicist and cosmologist **Neil Armstrong** (First man on the Moon) **Helen Sharman** (First British astronaut) **Tim Peake** (First British ESA astronaut)	(Wrinkle-Free Cotton) **Harry Brearley** (Stainless Steel) **Stephanie Kwolek** (Kevlar)	**James Brodie of Brodie** (Reproduction of Plants by Spores)	**Archimedes of Syracuse** (Levers)	

Vocab	**Earth and Space**	Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets
	Materials	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non-reversible change, burning, rusting, new material
	Forces	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears
	Animals including humans	Vocab to be decided alongside PSHE puberty topic
	Living things and habitats	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings

Year 5 - Suggested Linked Texts (Reading Across the Curriculum)

	Hidden Figures *(Margot Lee - Shetterley)* ***The Skies Above My Eyes*** *(Charlotte Guillain & Yuval Zommer)* ***Stephen Hawking: My first*** *(Little people, Big dreams)* ***George's secret key to the universe*** *(Lucy and Stephen Hawking)*    	***Itch*** *(Simon Mayo)* **Centrally heated knickers** *(Michael Rosen)*  	***Life Cycles-Everything from start to finish*** *(DK publishing)* ***The Lost Words*** *(Roger Macfarlane)* ***The Land of Neverbelieve*** *(Norman Messenger)* ***David Attenborough*** *(Little people, Big dreams)*    	***The Gigantic Turnip*** *(Alexei Tolstoy)* ***The Aerodynamics of Biscuits*** *(Clare Helen Welsh)* ***Galileo Galilei Genius*** *(Isabel Munoz)*   	***Hair in Funny Places*** *(Babette Cole)* ***Giant*** *(Kate Scott)* ***You're Only Old Once!*** *(Dr. Seuss)*   



Year 6

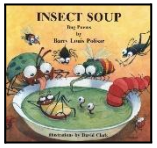
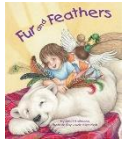
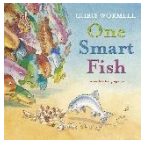
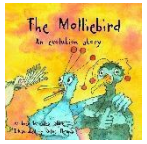
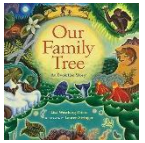
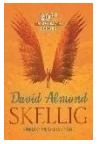
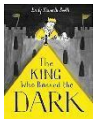
Year 6– Science Programme of Study – ***Knowledge and Understanding***

Year 6	**Living Things and their Habitats**	**Evolution and Inheritance**	**Animals inc. Humans**	**Light**	**Electricity**

	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.	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.	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.	Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that ojects are seen because they give out 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.	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 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
Working Scientifically	• Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary · Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate · Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs · Use test results to make predictions to set up further comparative and fair tests · Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations				

	· Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations · Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources · Group and classify things and recognise patterns				
	Famous Scientists				
	Carl Linnaeus (Identifying, Naming and Classifying Organisms) **Aristotle** (Simple understanding of classifying)	**Charles Darwin and Alfred Russel Wallace** (Theory of Evolution by Natural Selection) **Jane Goodall** (Chimpanzees)	**Justus von Liebig** (Theories of Nutrition and Metabolism) **Sir Richard Doll**(Linking Smoking and Health Problems) **Leonardo Da Vinci** (Anatomy)	**Alhazen—** discoveries in optics and knowing light affect our eyes **Dr Patricia Bath—** Laser cataract surgery	**Nikola Tesla—** invented the current power system that provides electricity in homes and buildings . **James Dyson—** British engineer developing electrical vehicles.
Vocab					

Year 6 - Suggested Linked Texts (Reading Across the Curriculum)

	Beetle Boy *(M G Leonard)* ***Insect Soup*** *(Barry Louis Polisar)* ***Fur and Feathers*** *(Janet Halfmann)*   	***One Smart Fish*** *(Christopher Wormell)* ***The Molliebird*** *(Jules Pottle)* ***Our Family Tree*** *(Lisa Westberg Peters)*   	***Pig-Heart Boy*** *(Malorie Blackman)* ***Skellig*** *(David Almond)* ***A Heart Pumping Adventure*** *(Heather Manley)*   	***Letters from the Lighthouse*** *(Emma Carroll)* ***The Gruffalo's Child*** *(Julia Donaldson)* ***The King Who Banned the Dark*** *(Emily Haworth-Booth)*   	*Blunders and Lightening (twinkl story)* 

Thomas Young

(Wave Theory of Light)

Ibn al-Haytham (Alhazen)

(Light and our Eyes)

Lesson Plan

Science Topic:			**Linked Scientists:** **Linked Text:**		
Lesson/ Date	**Learning Intentions** **Focus Subject** **Learning Intentions** **Working Scientifically**	**Key questions**	**Key vocabulary** .	**Previous learning- Progression of knowledge**	**Success Criteria** **Below** **Above**

Scientific Skill focused on:  Comparative and fair testing Identifying,grouping and classifying Observation over time Pattern Seeking Researching using secondary sources Problem Solving					
Pre-Assessment Task (First lesson of unit) / Biq Question (Sticky Knowledge) • **What will children record?** • **Collaborative Engagement** • **Working like a Scientist** • **Evaluate/Conclusion**					
Investigation Lesson: PLAN/DO/REVIEW					

<u>Sticky-Time</u> **Children will be given an object, an image or a question. They will recall their previous knowledge and skills and they will record their idea, answer or knowledge into their science books.**
<u>Collaborative Engagement</u> **Children will share their ideas, answers or experiences with their Talking Partner or in a small group.**
<u>Knowledge</u>

Children are introduced to the vocabulary and knowledge needed for the lesson, making links to children's previous learning and experiences. Teacher may model or demonstrate resources or the practical skills which the children will be expected to use in the next part of the lesson.
<u>Working Like a Scientist</u> **New knowledge is deepened as the children apply their scientific skills during the 'working scientifically' stage in the lesson**.
<u>Conclusion/Reflection</u> **Children will share their results, findings and experiences. They will decide what their findings have taught them, do they need to go further with their investigation?** .