CHACEWATER SCHOOL

Science at Chacewater School

Intent	"Science is discovering new things and how they work. We love science and feel excited and curious." (Pupil Conferencing) At Chacewater school our aim is to develop a fun, practical and engaging high-quality curriculum that inspires the next generation to foster a love for science, so that they can succeed and excel throughout their life. We promote and celebrate scientific role models and science vocations to foster aspirations for their own future. Our progressive curriculum focuses both on scientific knowledge (substantive knowledge) and working scientifically (disciplinary knowledge) so that the pupils are able to build upon prior learning and make connections. In this way the pupils are able to develop transferable scientific skills. We provide hands-on, practical activities that enable and encourage the pupils to question, explore and discover the world around them. We follow specific lines of enquiry: observation over time; identifying, classifying and grouping; comparative and fair testing; use of secondary resources and pattern seeking. These are then linked to working scientifically skills. We have built our curriculum following the 3 strands of science: biology, chemistry and physics as a way of creating transition between the primary and secondary phase. Where possible, we utilise the outdoor space for wider learning, contextual learning and also develop community links to celebrate the importance of science in a number of fields.
Implementation	Chacewater School provides full coverage of the new National Curriculum, following the programmes of study for each year group carefully. It provides a balance between working scientifically (disciplinary skills) and learning scientific facts (substantive knowledge) The acquisition of key scientific knowledge is an integral part of our science lessons. In addition, where there is a thematic link we aim to maximise this for learning in context, but sometimes, where they don't exist naturally, the subject is taught discretely. Working scientifically skills are embedded into lessons to ensure these are being developed throughout the children's school career, and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the themes. Each skill is often taught through a line of enquiry. Symbols accompany each skill and enquiry, and are used throughout the school as a hook and reference. The progression of skills for working scientifically are developed through the year groups as shown on the planner with scientific enquiry skills being of key importance within lessons.

LINES OF ENQUIRY

WORKING SCIENTIFICALLY SKILLS (KS1 focus on those highlighted)

PLAN			DO			REVIEW		
Ask scientific questions	Plan an enquiry	Make a prediction	Observe closely	Take measurements	Gather/record results	Present results	Interpret results/draw conclusions	Evaluate an enquiry

We have developed knowledge organisers to enable children to learn and retain the important, useful and powerful vocabulary and knowledge contained within each unit. We also start each unit with some form of concept map or prior knowledge task, so that the children can build upon previous learning and also make fundamental connections. (identifying vertical links as well as horizontal) Misconceptions can also be picked up on and addressed.

Science books are passed onto the next year so that children can use these as aid memoirs and strengthen their scientific understanding across each unit, which also enables them to make connections between different areas in science.

Programmes of study are taught across the year and are a driver for the overall theme where appropriate: KS1 (4 programmes of study) KS2 (5 programmes of study). We make specific decisions on the plants/animals to study in each year group based in part on our locality, the seasons, prior knowledge and the link to our themes to ensure progression.

At Chacewater, teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards by putting theory into practice and the real world so that science is both powerful and purposeful. In order that all pupils can access the science curriculum, we consider the following: varying recording methods; using pre-teach sessions; referencing and developing knowledge organisers and considering practical ways in which to

	promote and encourage high standards for all. In addition, floor books are used not only to record learning, but also as an aide memoire, which the children can actively use to support their learning and consolidate knowledge. These are also passed on to the next year so that pupils can refer back to previous learning and identify links across each theme.
Impact	The successful approach to the teaching of science at Chacewater results in a fun, engaging, high- quality science education that provides children with the foundations for understanding the world around them, in order that they can take this inquisitiveness with them once they complete their primary education. In order to identify the impact of our science teaching and learning we incorporate the following: reviewing prior knowledge; quizlets; mini tests; end of unit assessments; the use of individual science books taken throughout the school for reference/establishing links; concept maps and the use of floor books, which the children use regularly to solidify their understanding. We use TAPS (Teacher Assessment In Primary Science) to assess the working scientifically skills and track progress. In addition, we gather information about the impact of science. This includes: audits, pupils voice, staff input and development, book scrutinies and observations. Through these means we aim to establish that the children at Chacewater school: ● demonstrate a love of science work and an interest in further study and work in this field ● retain knowledge that is pertinent to Science with a real life context. ● are able to question ideas and reflect on knowledge. ● are able to articulate their understanding of scientific concepts and be able to reason scientifically using rich language linked to science. ● demonstrate a high love of mathematical skills through their work, organising, recording and interpreting results. ● work collaboratively and practically to investigate and experiment. ● achieve age related expectations in Science at the end of their cohort year.

‘L E A P’ Into SCIENCE at Chacewater

L ocal How do we use our locality in this subject? Local links? Chacewater and Cornwall Community Links and visits for this subject? Opportunities to explore, investigate and enquire?	At Chacewater, from the beginning of school, pupils begin to explore their local area and use their locality to learn about and discover science. Some examples include: Exploring and classifying plants, animals and everyday materials in the local environment Comparing findings in more than one area (school field, the rec, Millennium Green) Trips, such as the local garden centre and Feadon Farm Collecting data and taking measurements in areas in and around school Visits: dentist, doctors, paramedics, vets etc We make specific decisions on the plants/animals to study in each year group based in part on our locality.
E ngaging Memorable moments? Visits? People in school Hands on experiences? Choice of learning activities? Whole school events/themes National day and events?	Science should enable children to be "curious and excited" therefore we aim to provide many memorable moments for them. These include: Visits (examples being, a visit from paramedic who ran a information workshop about the heart and linked it to resuscitation and a visit from an animal handler) Investigations Explorations using the local environment Practical experiences - e/g. growing plants, pond dipping etc Use of KAGAN cooperative learning strategies Science Days and trips KS2/3 transitions and workshops Assemblies e.g a talk by Spaceport Cornwall employer
A spiring & Ambitious How do we make this subject challenging and exciting? What do want outcomes to look like? Key questions?	We make Science challenging and exciting by the following: links to our theme where appropriate (E.g. volcanic eruptions using the chemical reaction of combining vinegar and bicarbonate of soda in Y5) using high quality resources using chrome books and ipads to explore and investigate use of video clips, photographs, real life objects (as well as STEM/Explorify resources etc) encourage child led, hand-on exploration and investigation (Do children with longer legs jump further? Can bigger hands grab more sweets?) explore jobs/careers in the real world linked to science - eg. Jacqueline Auriol, aviator.

How do we ensure there is diversity e.g. range of artists, authors, historical figures, famous scientists	learn about inspirational people in the world of science (role models) building upon prior knowledge and introducing aspirational vocabulary as appropriate a range of scientists and naturalists are studied: e.g. Charles Darwin, George Forrest, Astronauts (Tim Peak, Helen Sharman)
P owerful & purposeful Sticky knowledge? How? What makes this subject memorable? Wider links - outside of our locality? Global issues? Cross curricular links Building in previous knowledge? How? Progression?	Our science curriculum shows clear progression in both knowledge and skills so that the pupils can retain and build upon their understanding, as well as establish links and connections. We have a number of strategies to support this including: recapping prior skills and knowledge knowledge organisers use of big books to reference and explore quizlets vocabulary is build upon incrementally and extended concept maps (to be added to as the pupils' knowledge develops) cross- curricular links where appropriate real world science - current news/world events (For example pupils learn about recent volcanic eruptions in Y5 and 'Save the bees' linked to pollination)
LINKS	https://www.stem.org.uk/primary-science https://explorify.uk/en/activities https://wordwall.net/en-us/community/games https://pstt.org.uk/resources/curriculum-materials/assessment https://get.plickers.com https://edu.rsc.org/primary-science/find-resources https://www.commonsense.org/education/top-picks/terrific-websites-for-science https://nearpod.com/library/

☐ CHACEWATER SCHOOL - OVERVIEW OF ASSESSMENT FOR WORKING SCIENTIFICALLY (disciplinary knowledge)

We use TAPS Assessment (TAPS) - Curriculum Materials | Primary Science Teaching Trust https://pstt.org.uk/unique-resources/taps/

	PLAN			DO			REVIEW		
EYFS YR PLANS	Autumn fruit Provocation			Lifecycle of an animal/ human			Floating and Sinking materials		
	PLAN			DO			REVIEW		
KS1 Develop close observation	ASK SCIENTIFIC QUESTIONS	PLAN AN ENQUIRY		OBSERVE CLOSELY	TAKE MEASUREMENTS	GATHER/RECORD RESULTS	PRESENT RESULTS	INTERPRET RESULTS/DRAW CONCLUSIONS	
Y1 TAPS PLANS	Materials for a boat	Materials for a boat		Plant Structure			Animal Classification	Seasonal Change Tree	
Y2 TAPS PLANS	Ordering Animal Life cycles			Comparing Plant Growth		Woodlice Habitat	Materials Hunt		
	PLAN			DO			REVIEW		
LOWER KS2 Develop systematic approach	ASK SCIENTIFIC QUESTIONS	PLAN AN ENQUIRY	MAKE A PREDICTION	OBSERVE CLOSELY	TAKE MEASUREMENTS	GATHER/RECORD RESULTS	PRESENT RESULTS	INTERPRET RESULTS/DRAW CONCLUSIONS	EVALUATE AN ENQUIRY
Y3 TAPS PLANS	Skeleton Research	Testing the Strength of Magnets	Testing the Strength of Magnets	Function of a stem plant	Shadow investigation		Reporting on Rocks	Function of a stem plant	
Y4 TAPS PLANS	Cornflour Slime		Daisies in a footprint	Teeth in Liquids		Conductors and Insulators		Teeth in Liquids	
UPPER KS2 Develop Independence	ASK SCIENTIFIC QUESTIONS	PLAN AN ENQUIRY	MAKE A PREDICTION	OBSERVE CLOSELY	TAKE MEASUREMENTS	GATHER/RECORD RESULTS	PRESENT RESULTS	INTERPRET RESULTS/DRAW CONCLUSIONS	EVALUATE AN ENQUIRY
Y5 TAPS PLANS	Space Travel Questions	Dissolving			Growth Survey Spinners	Aqua Dynamics	Life Cycle Research		Aqua Dynamics
Y6 TAPS PLANS	Raising and Sorting Light Questions	Raising and Sorting Light Questions	Bulb brightness		Resting Heart Rate Investigating Shadows	Outdoor Keys Investigating Shadows	Resting Heart Rate	Resting Heart Rate	Bulb brightness

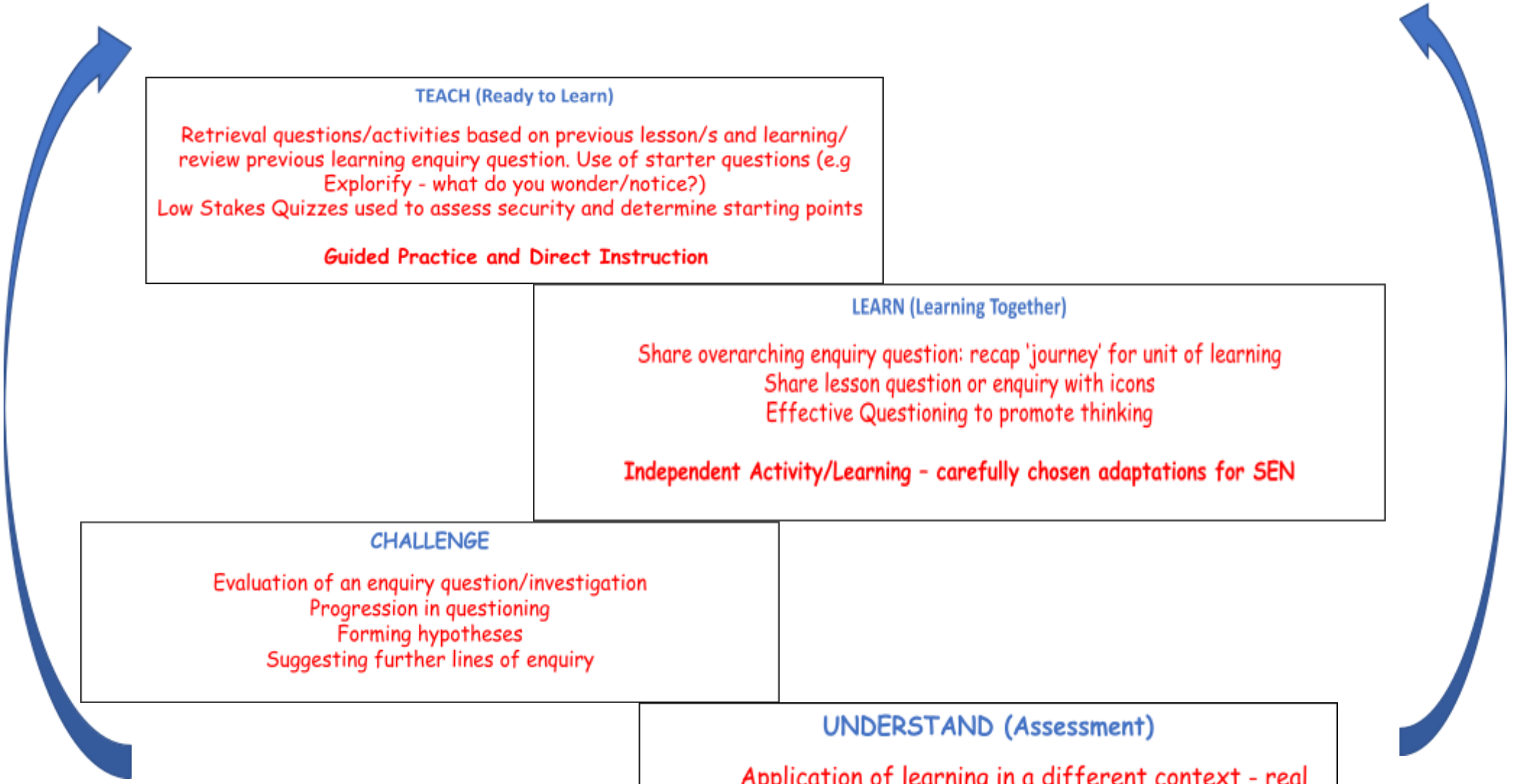
SCIENCE

PRE- LESSON

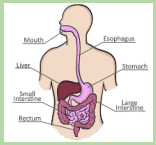
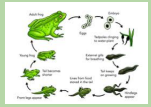
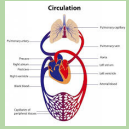
PURPLE PEN QUESTIONING PRIOR KNOWLEDGE

REFERRING BACK TO BOOKS/ BIG BOOKS/KNOWLEDGE ORGANISERS

PEDAGOGY


TEACH (Ready to Learn)
Retrieval questions/activities based on previous lesson/s and learning/ review previous learning enquiry question. Use of starter questions (e.g Explorify - what do you wonder/notice?)
Low Stakes Quizzes used to assess security and determine starting points
Guided Practice and Direct Instruction
LEARN (Learning Together)
Share overarching enquiry question: recap 'journey' for unit of learning
Share lesson question or enquiry with icons
Effective Questioning to promote thinking
Independent Activity/Learning - carefully chosen adaptations for SEN
CHALLENGE
Evaluation of an enquiry question/investigation
Progression in questioning
Forming hypotheses
Suggesting further lines of enquiry
UNDERSTAND (Assessment)
Application of learning in a different context - real purpose
Live marking and immediate feedback
Low Stakes Quizzes to check understanding

Biology Physics Chemistry	Chacewater School Science Theme Map Science links to themes as well as being taught as stand alone units (as shown below)					
	Autumn Term		Spring Term		Summer Term	
EYFS	What makes me a me? Staying healthy / Food / Human body How have I changed? My family.			Amazing Animals! Life cycles/Safari Animals around the world Hibernation Down on the Farm /Mini Beasts Night and day animals Happy Habitats. Life Cycle of butterflies Newts/ Tadpoles.	Come outside Plants - parts of a plant. How they grow. Seasonal changes	At the beach Materials
Year 1	Everyday Materials **Who am I?** **The Big Build** 		Animals, including humans **Animal Allsorts** 	Plants **The Potting Shed** 		Seasonal Changes **To the rescue!** 
Year 2	Animals, including humans **What do I need to be me?** 		Living things and their habitats **Wild Cornwall** 	Plants **Sowing and Growing** 		Everyday materials **What's your Super power?** 

Year 3	Animals, including humans **Brilliant Bodies; What's inside us?** 		Forces and Magnets **Poles Apart**	Rocks **Rocks and Fossils** 	Plants **Fabulous Plants** 	Light
Year 4	Animals, including humans **Where does my food go?** 		States of matter the water cycle **Rivers** 	Electricity & sound **A world of Inventions** 	Living things and their habitats **The Three Peaks & seven summits - Mountains** 	
Year 5	Living things and their Habitats Animals, including Humans **Life Cycles** 		Properties and changes of materials **Natural Disasters; Why is our Earth so volatile?** 	Earth and Space **Why leave Earth?** 	Forces **May the force be with you** 	
Year 6	Animals, including Humans **Have a Heart** 		Evolution and Inheritance Living things and their Habitats **Voyage of Discovery!** 			Light Electricity **Industrial Revolution and Victorians**

Reception

EYFS Science Overview linked to Development Matters Statements revised framework 2021.

Progression of skills are: developed over the topics covered throughout the year (linked to the child's interests) and developed from the Autumn Term (with a focus on 3-4 statements), and the Spring Term (focus on reception aged statements) and the Summer Term (with a focus on ELG statements).

Children are constantly exposed to elements of all of these statements in continuous provision opportunities which are facilitated by the adults in the room, the opportunities exposed to children through their interests and the questions asked.

Autumn Theme: All about Me	**Spring Term Theme:** **Superheroes** **Amazing Animals**	**Summer Term Theme:** **Come Outside**
EYFS Statutory Educational Programme: Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.		
What makes me a me? **Coverage -** Children learnt about themselves. They look at themselves compared to others and start to identify simple parts of the human body - what makes me a me? **Hook books to support this learning** What makes me a me? Elmer the Elephant The Rainbow Fish	**Amazing Animals** **Coverage -** Children look closely at the lifecycle of animals. They do this by learning about animals in different countries, what they need to survive and how some animals are similar to us. Children learn about animals which are extinct and why this is. Children observe their very own class	**Come Outside** **Coverage -** Children learn about seasonal changes and what happens during these Seasons - what differences do we see and why? Children learn about plants by growing their own plants. They learn about what makes up a plant and watch the cycle of them growing.

Owl babies Rainbow Fish **Development Matters -** Name and describe people who are familiar to them. **Examples of how we do this -** Listen to what children say about their own experiences with people who are familiar to them.	animals change overtime by witnessing the life cycle of a caterpillar/butterfly and tadpole/frog. **Hook books to support this-** Dear Zoo The Hungry Caterpillar The Tiger who went to tea Monkey Puzzle Lost and found **Development Matters -** 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. Provide equipment to support these investigations. Suggestions: magnifying glasses or a tablet with a magnifying app. **Examples of how we do this-** Help children to care for animals and take part in first-hand scientific explorations of an-imal life cycles, such as caterpillars.	**Hook books to support this-** The Enormous Turnip **Development Matters -** Plant seeds and care for growing plants. Understand the effect of changing seasons on the natural world around them. **Examples on how we do this-** Encourage children to talk about what they see. Model observational and investigational skills. Ask out loud: “I wonder if…?” Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas. Show and explain the concepts of growth, change and decay with natural materials. Suggestions: Plant seeds and bulbs so children observe growth and decay over time. Observe an apple core going brown and mouldy over time. Guide children’s understanding by draw children’s attention to the weather and seasonal features. **At the beach** **Coverage** Children look at different modes of transport and life at a beach. They recap on their prior animal learning and experiment by creating their own boats - do they float? Do they not? Why not?

	Plan and introduce new vocabulary related to the exploration. Encourage children to use it in their dis-cussions, as they care for living things.	**Hook Books to support this** Lighthouse keepers lunch Under the sea Chip **Development Matters -** Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Explore and talk about different forces they can feel. **Examples of how we do this-** Provide interesting natural environments for children to explore freely outdoors. Make collections of natural materials to investigate and talk about. How the water pushes up when they try to push a plastic boat under it How they can stretch elastic, snap a twig, but cannot bend a metal rod magnetic attraction and repulsion

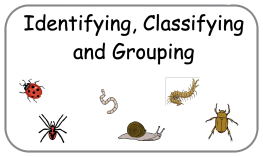
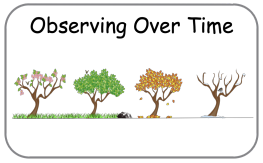
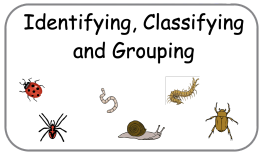
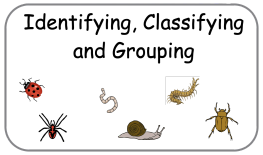
Year 1

Y1 THEME	**Autumn term 1** The Big Build Everyday Materials 	**Spring term 1** Animal Allsorts Animals, including humans  **Spring term 2** The Potting Shed Plants 	**Summer Term2** Pirates (seaside) /To the rescue Seasonal Changes  
Y1 National Curriculum Programme of Study **END POINTS**	Everyday Materials EM1 distinguish between an object and the material from which it is made EM2 identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock EM3 describe the simple physical properties of a variety of everyday materials EM4 compare and group together a variety of everyday materials on the basis of their simple physical properties	Animals, including Humans AH1 identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals AH2 identify and name a variety of common animals that are carnivores, herbivores and omnivores AH3 describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) AH4 identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Seasonal Changes SC1 observe changes across the four seasons SC2 observe and describe weather associated with the seasons and how day length varies.

		Plants P1 identify and name a variety of common wild and garden plants, including deciduous and evergreen trees P2 identify and describe the basic structure of a variety of common flowering plants, including trees.	
Y1 Substantive Knowledge and SPECIFICS	Everyday Materials *There are many different materials that have different describable and measurable properties.* *Materials that have similar properties are grouped into metal, water, rock, wood, plastic and glass.* *The properties of a material determine whether they are suitable for a purpose.* ***Wood** Properties: strong, flexible, long lasting, hard* ***Metal** Properties: strong, hard, shiny, smooth* ***Plastic** Properties: smooth, flexible, strong, waterproof* ***Glass** Properties - waterproof, see through, hard, smooth, strong but can shatter*	Animals, including Humans ***Parts of human body:** eyes, ears, nose, foot, thumb, toes, teeth, elbow, hand, fingers, shoulder, mouth, tongue, neck, head* *Senses - we have them to survive - and then respond* *eyes : sight* *ears: hearing* *tongue : taste* *skin : touch* *nose: smell (comparative & pattern seeking test)* Carnivores (meat eating) : lions/*cats, polar bears, sharks* *Herbivores (plant eating) : horses, elephants, giraffes*	Seasonal Changes *There are 4 seasons* ***Winter:** Shorter and colder days Cold & icy* ***Spring:** Flowers start to grow* ***Summer:** Days are longer and hotter* ***Autumn**: Leaves fall from deciduous trees* *Weather can change* *Different types of weather: rain, sun, wind, snow, cloudy, fog, mist, thunderstorm*

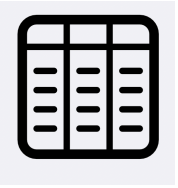
	Rock *Properties - some hard (granite), some soft (chalk).* ***Water*** *Properties: Natural, clear, takes many shapes. Frozen = ice, heated = gas* link to Big Build 'making shelters'	*Omnivores (eats both plants and animals): humans, foxes, dogs* *Fish: cod, tuna, goldfish* *Mammals: humans, dolphins, dogs, hamsters,* *Reptiles: snakes, lizard, gecko,* *Amphibians: frogs, toads, sloworms* *Birds: blackbird, sparrow, vulture* *Animals need food to: survive, grow, repair their bodies, be active, stay healthy.* animals: fox, owl, mouse, snake, dog, penguin Plants *Deciduous trees lose their leaves in the winter (identify oak, beech, birch, horse chestnut)* *Evergreen trees keep their leaves all year round (identify holly, yew, fir - sorting leaves investigation)* *We eat different parts of different plants. (roots, fruit, seeds, stem) (observe and grow vegetables and flowers in the garden)* *leaf fruit seed branch trunk root* *flower (petal) Leaf seed stem root bulb* wild plants: buttercup, daisy, dandelion, clover, brambles. garden plants: lavender, daffodil, sunflower. rhododendron	

		trees: horse chestnut, oak, fir, pine vegetables - rhubarb, carrots, other vegetables growing in the school garden	
Y1 Vocabulary Yellow - words most children will already know Green - new vocabulary to teach and assess against Blue - aspirational vocabulary	Everyday Materials Wood, Plastic, Glass, Paper, Water, Metal, Rock, brick, fabric. Hard, Soft, Bendy, Rough, Smooth, stretchy, waterproof, absorbent, opaque, transparent, solid, flexible	Animals, including humans animal, bird, fish, insect, pet, head, arm, leg, foot, face, teeth, shoulders, ear, eye, nose, hand Fish (scales, fins, gills), Reptiles (scales, leg eggs) , Mammals (breath air, fur, hair, live young, produce milk) , Birds (wings, beak, feathers, eggs) , Amphibians (born in water, smooth slimy skin) Herbivore, Omnivore, Carnivore, sight, hearing, touch, taste, smell warm blooded, cold-blooded Plants tree, flower, leaf, garden, Deciduous Evergreen trees, Leaves, Flowers, Petals, Fruit, Roots, Seed, Trunk, Branches, Stem, wild plant, garden plant, weed bulb, blossom	Seasonal Changes Summer, Spring, Autumn, Winter, weather, sun, moon, day, night, light/dark Daylight, season, rain, snow, ice, storm, thunder, lightening, cloudy, clothing, warm, cold, forecast rainfall, precipitation, data, wind direction, gauge, patterns

Y1 ENQUIRY SKILLS	 We need to choose a material to make a wolf-proof window. Which materials are transparent & waterproof? (plan an enquiry) How can we group these materials according to their properties? (present results)  What happens to ice left on the windowsill? (observe closely)  Which materials are the most flexible? (interpret results)	 How can we organise animals? (e.g. omnivores/ carnivores/ herbivores) (to observe closely) How can we **sort** the leaves that we collected on our walk? (observe closely)  Which tree has the biggest leaves? (taking measurements)  Is there a pattern in where we find moss growing in the school grounds? (to ask scientific questions) What are the names for all the parts of our bodies? (to observe closely)	 How do you know what season this is? (observe closely)  In which season does it rain the most? (interpret results)

		Research Using Secondary Resources  What are the most common British plants and where can we find them?	

Y1 Working Scientifically (Disciplinary Knowledge)

PLAN		DO			REVIEW	
Ask scientific questions 	Plan an enquiry 	Observe closely 	Take measurements 	Gather/record results 	Present results 	Interpret results 

Y1 Progression of Skills

asking simple questions and recognising that they can be answered in different ways

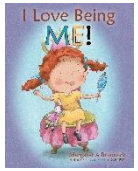
observing closely, using simple equipment and measurement

performing simple tests

identifying and classifying

using their observations and ideas to suggest answers to questions

gathering, recording and communicating data and findings to help in answering questions.

Year 2			
Y2 THEME	**Autumn term 1** What do I need to be me? Animals including humans 	**Spring Term 1** Wild Cornwall Living things and their habitats  **Spring Term 2** Sowing and Growing Plants 	**Summer Term 2** What's your Super power? Uses of everyday materials 
Y2 National Curriculum Programme of Study **END POINTS**	Animals including Humans AH1 notice that animals, including humans, have offspring which grow into adults AH2 find out about and describe the basic needs of animals, including humans, for survival (water, food and air) AH3 describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Living Things and their Habitats LH1 explore and compare the differences between things that are living, dead, and things that have never been alive LH2 identify that most living things live in habitats to which they are suited LH3 describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other	Uses of Everyday Materials EM1 identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses EM2 find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

		LH4 identify and name a variety of plants and animals in their habitats, including micro-habitats LH5 describe how animals obtain their food from plants and other animals LH6 understand a simple food chain, and identify and name different sources of food. Plants P1 observe and describe how seeds and bulbs grow into mature plants P2 find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	
Y2 Substantive Knowledge and SPECIFICS	Animals including Humans ***Basic needs of animals for survival***: *water, food (nutrition), air* ***Importance for humans of***: *exercise, diet (comparison over time investigation), hygiene* ***Life cycle for animals*** *Baby, toddler, child, teenager, adult* *Once they are adults, they do not get bigger* *Animals reproduce (have babies - offspring)* *Animals will die at some point in their life*	Living Things and their Habitats *Some things are **living**, some were **once living** but are now dead and some things **never lived**.* *All living things have characteristics that are essential for keeping them alive (- moving, growing, link to senses (y1), getting rid of waste, having babies, breathing, taking in food and water)* *Animals obtain their food from plants and other animals.* ***Herbivores** eat plants, **carnivores** eat other animals, **omnivores** eat plants and animals.*	Uses of Everyday Materials *Materials can be changed by force - twisting, bending, squashing and stretching* ***Wood** Uses: building materials, tables, chairs, doors, beds, cupboards, picture frame* ***Metal** Properties: malleable, some are magnetic, some allow electricity to pass through. Uses: knives, forks, shovels, pipes* ***Glass** Uses: windows, mirrors, glasses* ***Rock** Uses: building material, cooking* ***Plastic** Properties: can be made into any shape, not magnetic, can be coloured, transparent,*

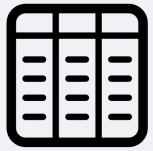
	Animals move *in order to survive* ***Animals move*** *by the muscles and bones working together* *Exercise keeps animal's bodies in good condition and increases survival chance* ***Life cycle*** *(Identify & classify - which offspring belong to which animal?)* *egg, chick, chicken egg,caterpillar,pupa, butterfly spawn, tadpole, frog, lamb, sheep.* Life cycle of humans Life cycle of a chicken	*A* ***predator*** *is a carnivorous animal and the animal they eat is their* ***prey.*** *(simple food chains)* *Animals and plants depend on each other to survive. (plants are a source of food and shelter for animals) .* *Different animals and plants live in different places.* *A* ***habitat*** *is a natural environment or home of a variety of plants and animals. (focus on ocean, coastal and woodland habitats)* *Different habitats provide for the basic needs of different kinds of animals and plants.* *Living things are adapted to survive in different habitats.* *A* ***micro-habitat*** *is a very small habitat. (focus on minibeast and pond life)* Ocean habitat Coastal habitat Woodland habitat Micro habitat Basic food chains (3 stages) Plants *Plants grow from* ***bulbs or seeds*** *They have a store of food so do not need light to grow.*	*translucent or opaque. Uses: bank cards, watering cans, toys, bottles* ***Rubber*** *Properties: strong, elastic, flexible* *Uses: car tyres, hoses, belts, matting, medical gloves* ***Paper*** *Properties: flexible, lightweight. Uses: newspaper, wrapping paper, envelopes, magazines, cartons* ***Fabric*** *Properties - warm, absorbent, soft, flexible, some fabrics are natural - cotton is cool and absorbent, wool gives warmth, some are man-made - easy to wash and dry and hard-wearing. Uses: clothes, cloths, scarfs, gloves* ***Pottery*** *Properties - strong but glaze pottery can shatter, usually opaque. Uses: crockery, tiles* ***Cardboard*** *Properties: strong, light, stiff Uses: boxes, cereal boxes, paper towels, chipboard*

		Germination: *Warmth, water NO LIGHT (underground)* ***Plants*** *need* ***light, water*** *and* ***warmth*** *to grow and stay healthy.* ***Flowers*** *make seeds to make more plants (reproduce)* Broad bean plant Daffodil bulb Oak Tree Plant conditions experiment - no light but water, water but no light, both and neither for bulbs and seeds	
Y2 Vocabulary Yellow - words most children will already know Green - new vocabulary to teach and assess against Blue - aspirational vocabulary	Animals including humans Adult, Baby, Water, Air, Food, Growth, Exercise, Kitten, Calf, Puppy, meat, vegetables, Young, toddler, child, teenager Offspring, Hygiene, Survival, balanced diet, elderly, heart rate, healthy, unhealthy nutrients, vitamins, reproduce, nutrition	Living things and their habitats living, dead, pond, insect, carnivore, omnivore, basic needs, herbivore, habitat, energy, food chain, predator, prey, woodland, desert, micro, life processes, coastal, alive producer, consumer, adaptation, sources Plants Growth, Water, Light, Seeds, soil, roots, sunlight, leaf, flower, stem, tree temperature, bulbs, seedling, shoot, wither, suitable, bud, condition nutrients, seed dispersal	Uses of everyday materials hard, Soft, rough, smooth, waterproof, shiny, wood, plastic, glass, brick, rock, paper, cardboard, foil, material, object squashing, twisting stretching, stiff, bending, shiny, dull, metal, elastic, suitability, see through, properties absorbent, opaque, transparent, translucent, reflective

Y2 ENQUIRY SKILLS			
	Research Using Secondary Resources  What food do you need in a healthy diet and why?What do you need to do to look after a pet dog/cat/lizard and keep it healthy? Identifying, Classifying and Grouping  Which offspring belongs to which animal? (observe closely) Observing Over Time  How much food and drink do I have over a week? (gather and record results)	Identifying, Classifying and Grouping  What are the similarities and differences between bulbs and seeds? (observe closely and ask scientific questions) Can you group things to show which are living, dead, or have never been alive? (observe closely) Observing Over Time  What happens to my bean after I have planted it? Germination (observing closely) Comparative and Fair Testing  Do cress seeds grow quicker inside or outside? (plan an enquiry)	Comparative and Fair Testing  Which material would be best for ….? (plan an enquiry) Identifying, Classifying and Grouping  Can you group these items according to their properties and uses?- float/sink, let electricity go through them/not shiny/dull? (present and interpret results)

		Pattern Seeking  Do bigger seeds grow into bigger plants? (interpret results) What conditions do woodlice prefer to live in? (present results)	

Y2 Working Scientifically (Disciplinary Knowledge)

PLAN		DO			REVIEW	
Ask scientific questions 	Plan an enquiry 	Observe closely 	Take measurements 	Gather/record results 	Present results 	Interpret results 

Y2 Progression of Skills

asking simple questions and recognising that they can be answered in different ways

observing closely, using simple equipment and measurement

performing simple tests

identifying and classifying

using their observations and ideas to suggest answers to questions

gathering, recording and communicating data and findings to help in answering questions.

Year 3			
Y3 THEME	**Autumn term 1** Brilliant Bodies:What's inside us? Animals, including humans 	**Spring term 1** Forces and Magnets **Spring term 2** Rocks and Fossils Rocks 	**Summer term 1** Fabulous Plants Plants  **Summer term 2** Light
Y3 National Curriculum Programme of Study **END POINTS**	Animals including Humans AH1 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 AH2 identify that humans and some animals have skeletons and muscles for support, protection and movement.	Forces and Magnets FM1 compare how things move on different surfaces FM2 notice that some forces need contact between two objects, but magnetic forces can act at a distance FM3 observe how magnets attract or repel each other and attract some materials and not others FM4 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 FM5 describe magnets as having two poles	Plants P1 identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers P2 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 P3 investigate the way in which water is transported within plants P4 explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

		FM6 predict whether two magnets will attract or repel each other, depending on which poles are facing Rocks R1 compare and group together different kinds of rocks (including those in the locality) on the basis of appearance and simple physical properties R2 describe in simple terms how fossils are formed when things that have lived are trapped within rock R3 recognise that soils are made from rocks and organic matter.	Light L1 recognise that they need light in order to see things and that dark is the absence of light L2 notice that light is reflected from surfaces L3 recognise that light from the sun can be dangerous and that there are ways to protect their eyes L4 recognise that shadows are formed when the light from a light source is blocked by a solid object L5 find patterns in the way that the size of shadows change.
Y3 Substantive Knowledge and SPECIFICS	Animals, including humans ***The Skeleton:*** ***Supports*** *Holds upright* ***Protects vital organs*** *Skull: brain, Ribs: lungs Pelvis: reproductive organs* ***Movement:*** *Connected to bones and move the when they contract (contract and relax) Movable joints connect bones (comparative investigation)*	Forces and Magnets *Objects move differently on different surfaces.* *Some forces need contact between 2 objects, but magnetic forces can act at* *Magnets exert non-contact forces, which work through some materials and can act at a distance.* *Magnet forces are affected by magnet strength, object mass, distance from object and object material.*	Plants *Different plants need different amounts of* ***air, light, water, nutrients*** *from the soil and* ***room to grow****. (orchids don't need soil)* *Seed dispersal: Water (coconuts) Wind (sycamore) Animals in droppings (fruit) Animals on fur (barbed seed)* ***Every part of a flowering plant has a function:*** ***Flower****: has petals to attract insects for reproduction*

	Exoskeleton - skeletons outside the body *Endoskeletons - skeletons inside the body* *(Identify and classify: looking at different skeletons)* *Vertebrate - animals with a backbone* *Invertebrate - animals without a backbone* *Animals need the right types and amount of nutrition (carbohydrates, proteins, fats, vitamins, mineras, water fibre)* *Animals cannot make their own food* *Animals get their nutrition from what they eat. A nutritious balanced diet is important* *Different animals are adapted to eat different foods.* ***Nutrients, water and oxygen** are transported within animals and humans.* Human, mouse, tarantula, crab, jellyfish.	*We use different types of magnets for different functions in our everyday life.* *Magnets exert attractive forces on some materials. Magnetic materials are always made of metal, but not all metals are magnetic. Iron is magnetic, steel is magnetic because it has iron in it.* *Magnets have 2 poles - north pole and south pole.* *Magnets exert attractive and repulsive forces on each other.* *Like poles repel each other (N-N or S-S) and opposites attract (N+S or S+N)* Rocks *There are different types of rock with different properties - (build on year 1 and 2 knowledge)* *Some are permeable (sandstone) and allow water to pass through. Some are impermeable (slate) so water cannot pass through them. Some hard (granite), some softer (chalk).* *Some rocks come from volcanoes, some build up with layers and have fossils in them and some change from one type to another. They may have grains or crystals.* *Fossils are formed when things that have lived are trapped within layers of sediment over a long period of time and under extreme pressure.*	***Leaves:** absorb sunlight and carbon dioxide* *(**photosynthesis** to make their own food - they are **PRODUCERS**)* ***Stem/trunk:** - transports water and supports the leaves (celery investigation and /or carnation investigation)* ***Roots:** act as an anchor and draws water from the soil* ***Pollination:** The act of transferring pollen grains from the male anther of a flower to the female stigma. This is producing offspring for the next generation. (4 stages)* *- Insects attracted by **bright colours and sweet nectar*** *- **Pollen stays** onto the insect* *- Insect flies to another plant attracted by the bright colours and sweet nectar and the **pollen rubs off*** *- **Fertilisation** happens* *- Seeds are produced* ***Stamen** is the male part; **Stigma** is the female part* Life Cycle of a Dandelion Radish - fast germinator edible root Primrose - seed Hyacinth - Bulb

		They are then found within the rock that is formed. *Fossils tell us what has happened before.* *Fossils provide evidence that living things have changed over time.* *Rocks break down over time to become part of the soil mixture.* *Soil is made from rocks and organic matter.* *Half of soil is air and water. In soil you can find sand, small stones, bits of leaves and roots. There are also millions of microorganisms in the soil which help break down the matter and make the soil healthy and full of life.*	Apple Tree - life cycle Light *Light is a form of energy which makes it possible to see and it comes from a source. A light source can be natural (such as the sun) or man-made (such as a torch or light bulb).* *There must be light for us to see. Without light it is dark. Dark is the absence of light. Objects are easier to see if there is more light.* *Light is reflected from surfaces. We need light to see things even shiny things. Shiny materials reflect light beams better than non-shiny materials.* *When light hits an object, it can be absorbed by the object, reflect (bounce off) the object, or (transmit) pass through an object. The three key terms below tell us how much light objects let through them.* ***Transparent** – Transparent objects allow all of the light to pass through them. This means that we can clearly see through them. **Translucent** – Translucent objects only allow some light to pass through them. This means that we can partially see through them. **Opaque** – Opaque objects do not allow any light to pass through them. This means cannot see through them at all.* *Some types of light (e.g. light from the sun) can be dangerous for our eyes and skin. This is*

			because they contain UV rays that can cause damage. There are several things that we can do to protect ourselves in the sun *1. Wearing sunglasses – Sunglasses reduce the amount of light (and also the UV rays) that reaches our eyes.* *2. Covering up – Clothes can help to block some of the UV rays that can damage our skin.* *3. Sun cream – This stops our skin from absorbing as many UV rays, protecting it from harm.* *You should NEVER look directly at the sun.* *Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface, blocking some of the light.* *The size of the shadow depends on the position of the source, the object and the surface. When the light source hits the object at an angle, the shadow will be longer.*
Y3 Vocabulary Yellow - words most children will already know Green - new vocabulary to	Animals, including humans Movement, muscles, bones, water. Skull, nutrition, skeletons, vertebrate, invertebrate, vitamins, minerals, fat, protein, carbohydrates, fibre, ribs, spine, organs, joints, muscles, contract, relax. Muscular-skeletal system.	Forces and Magnets Push, Pull, group, materials, facing. Force, contact, move magnetic, attract, repel, friction, poles, magnet. Bar magnet, ring magnet, button magnet, horse-shoe magnet, constant force, Newton meter.	Plants Air, light, water, roots, stem/trunk, leaves and flowers, soil, seed, bulb. Reproduction, function, transportation, dispersal, pollination, nutrients, investigation, petal, pollen.

teach and assess against Blue - aspirational vocabulary		**Rocks** Brick, rock, soil, change. Organic matter, top soil sub soil, bedrock, igneous, magma, pressure, layers, hardens, fossils, sedimentary, igneous, metamorphic. Solidifies, minerals, compressed, chemically, crystals, grains, erosion, deposited.	Stigma, style, ovary, ovale, anther, filament, sepal **Light** Light, shadows, mirror, dark, change, pattern, sun. Reflective, reflection, absence, surfaces, protection, solid, light sources. Spectrum, refraction.
Y3 ENQUIRY SKILLS	Comparative and Fair Testing  Do you jump further with longer legs? (plan an enquiry/gather,record and interpret results) Research Using Secondary Resources  What animals have a hydrostatic skeleton and what is it?	Pattern Seeking  Do magnetic materials always conduct electricity? (plan an enquiry) How does a coin move across a variety of surfaces (gather and record results) Observing Over Time  If we magnetise a pin, how long does it stay magnetised for? (evaluate enquiry)	Identifying, Classifying and Grouping  How many different ways can you group our seed collection? (observe closely) How are seeds dispersed? (present results) Can you identify light sources and reflectors? (draw conclusions) Comparative and Fair Testing  Do plants need soil to grow? (plan an enquiry)

	Identifying, Classifying and Grouping  How do the skeletons of different animals compare? (to be able to ask scientific questions)	Identifying, Classifying and Grouping  Can rocks be grouped according to their properties? - check names using identification key (observe closely) Comparative and Fair Testing  Which magnet is strongest? (make a prediction) How does adding different amounts of sand to soil affect how quickly water drains through it? (gather/record results) (to interpret results and draw conclusions)	Observing Over Time  What happens to celery when it is left in a glass of coloured water? (observe closely) (interpret results and draw conclusions) How does my shadow change over the day? (gather and record results) Pattern Seeking  Can you find patterns in the way that the sizes of shadows change? (make a prediction)

Y3 Working Scientifically (Disciplinary Knowledge)

PLAN			DO			REVIEW		
Ask scientific questions 	Plan an enquiry 	Make a prediction 	Observe closely 	Take measurements 	Gather/record results 	Present results 	Interpret results/draw conclusions 	Evaluate an enquiry 

Y3 Progression of Skills

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

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

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

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

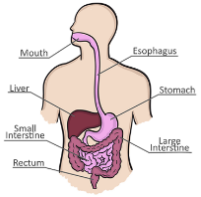
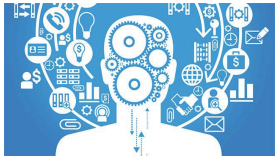
reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

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

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

using straightforward scientific evidence to answer questions or to support their findings

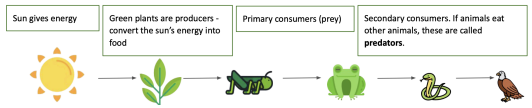
Year 4

Y4 THEME	**Autumn term 1** Where does my food go? Animals, including humans 	**Spring term 1** Raging Rivers and Cornish Coasts States of matter the water cycle  **Spring term 2** A world of Inventions Electricity & sound 	**Summer term 1** Mountains- The Three Peaks Living things and their habitats 
Y4 National Curriculum Programme of Study **END POINTS**	Animals including Humans AH1 describe the simple functions of the basic parts of the digestive system in humans AH2 identify the different types of teeth in humans and their simple functions	States of Matter SM1 compare and group materials together, according to whether they are solids, liquids or gases SM2 observe that some materials change state when they are heated or cooled, and measure or research the	Living things and their Habitats LH1 recognise that living things (including those in the locality) can be grouped in a variety of ways LH2 explore and use classification keys to help group, identify and name a

	AH3 construct and interpret a variety of food chains, identifying producers, predators and prey.	temperature at which this happens in degrees Celsius (°C) SM3 identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Electricity E1 identify common appliances that run on electricity E2 construct a simple series circuit, identifying/naming its basic parts, including cell, wire, bulb, switch and buzzer E3 identify whether or not a lamp will light in a simple series circuit/ E4 recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit E5 recognise some common conductors and insulators, and associate metals with being good conductors Sound S1 identify how sounds are made, associating some of them with something vibrating S2 recognise that vibrations from sounds travel through a medium to the ear	variety of living things in their local and wider environment LH3 recognise that environments can change and that this can sometimes pose dangers to living things.

		S3 find patterns between the pitch of a sound and features of the object that produced it S4 find patterns between the volume of a sound and the strength of the vibrations that produced it S5 recognise that sounds get fainter as the distance from the sound source increases.	
Y4 Substantive Knowledge and SPECIFICS	Animals including Humans ***Teeth & functions*** *(Identify & Classify)* ***Incisor****: found at the front,humans have 8, flat side for cutting* ***Canines****: sharp pointed teeth used for earing. Humans have 4* ***Premolar*** *: humans have 8* ***Molar****: rounded with a flat surface, used for grinding food into smaller parts. Humans have 12* *Caring for teeth: ● Regular dentist ● Cleaning regularly ● Diet (observation over time investigation)* ***Digestive system***	States of Matter *Materials can be divided into solids (flour, ice, wood), liquids (honey, water, milk) and gases. (steam, oxygen, carbon dioxide, helium)* *Solids, liquids and gases are described by observable properties.* ***Solids:*** *stay in one place and can be held/ keep their shape. They do not flow like liquids/always take up the same amount of space. They do not spread out like gases/ can be cut or shaped.* *Even though they can be poured, sugar, salt and flour are all solids. Each particle of salt, for example, keeps the same shape and volume.* ***Liquids:*** *can flow or be poured easily. They are not easy to hold/change their shape depending on the container they are in/Even when liquids change their shape, they always take up the same amount of space. Their volume stays the same.*	Living things and their Habitats *Living things can be grouped in different ways. (wide selection including animals, flowering plants and non-flowering plants - pond dipping, ocean)* *Vertebrates (backbone)* ***Classification*** ***Mammals:*** *live young, hair/fur, lungs , provide milk for young, warm blooded* ***Birds****: lay eggs with hard shells, feathers, lungs, warm blooded* ***Fish****: lay eggs, scales, gills, cold blooded* ***Amphibians****: smooth or bumpy, moist skin, Lay eggs with soft shells, cold blooded,*

	Organs that break down food so that it can be absorbed by the body. It also gets rid of waste *from the body.* ***Teeth**: cut and chew food and saliva is added.* *The food is soft and easier to swallow.* *The **tongue** moves food around the mouth* ***Oesophagus** : transport food from the mouth* *to the stomach* ***Stomach** : contains enzymes to help* *break down food and kill any microorganisms that may have been swallowed with the food* ***Small intestines**: Digested food is absorbed through the walls of the small intestine. The blood then carries the nutrients around the body. The wall of the small intestine is covered in **villi**, which helps the efficiency of transference of nutrients.* ***Large intestines:** Now that all the goodness has been absorbed, waste is left which cannot be absorbed or the body doesn't need. This is called **faeces**. His comes out of the body via the rectum.* ***Gallbladder**: stores bile, which is made in the liver. This breaks down fatty food.*	***Gases:** are often invisible/ do not have a fixed shape. They spread out and change their shape and volume to fill up whatever container they are in/ can be squashed.* *Heating causes solids to melt into liquids and liquids evaporate into gases.* *Cooling causes gases to condense into liquids and liquids to freeze into solids. The temperature at which given substances change state are always the same.* ***The water cycle** is the continuous journey of water from the land to the sky and back to the land again. This constant movement of water is happening all the time and is vital to supporting life on earth.* *There are **three main stages in the water cycle:*** ***Evaporation** happens when warmth from the sun causes water (liquid) from the sea, lakes and rivers to rise into the air and turn to vapour (gas). **Condensation** happens when the water vapour cools and turns back into drops of water which form clouds in the sky. **Precipitation** is when the clouds get too heavy and water falls from the clouds in the form of rain, snow, sleet or hail.* Electricity *A source of electricity (mains or battery) is needed for electrical devices to work. Kettle, lamp, television etc uses the mains electricity. A mobile phone, tablet, torch uses batteries.*	***Reptiles**: scales, usually lay eggs (Leathery shells), cold blooded(classification keys investigation)* ***Environmental change** affects different habitats differently.* *Different organisms are affected differently by environmental change.* ***Habitats** change throughout the year.* ***Human activity** significantly affects the environment both **positively** and **negatively**.*

	Food chains - energy is transferred from the sun to animals through consumption  4 or 5 stage food chain	*Electricity sources push electricity round a circuit.* *Electricity (mains) can be dangerous and it is important to know how to work with electricity safely.* *A complete circuit is needed for electricity to flow and devices to work.* *A complete circuit is a loop that allows electrical current to flow through wires.* *A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).* *The electrical current flows through the wires from the battery (cell) to the bulb, motor or buzzer).* *A switch can break or reconnect (close or open) a circuit.* *A switch controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow. This is not the same as an incomplete circuit.* *Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.* *Many metals, such as copper, iron and steel, are good conductors of electricity. Plastic, wood,*	

		glass and rubber are examples of good electrical insulators. Sound ***Sound** is created when **something vibrates and sends waves of energy (vibration) into our ears.** The vibrations travel through the air or another medium (solid, liquid or gas) to the ear.* *Sound moves through all materials by making them vibrate.* *The stronger the vibrations, the louder the sound.* *Sounds are fainter the further you get from the sound source. Sound spreads out as it travels. Bigger vibrations produce louder sounds and smaller vibrations produce quieter sound* ***Pitch is the quality of a sound (high or low) and depends on the speed of the vibrations.*** *Different materials produce different pitches; if an object vibrates quickly we hear a high-pitched sound, and if an object vibrates slowly we hear a low-pitched sound* *Faster vibrations (higher frequencies) produce higher pitched sounds* *Changing the shape, size and material of an object will change the sound it produces* *Sound travel can be blocked. (sound muffling investigation)*	

Y4 Vocabulary Yellow - words most children will already know Green - new vocabulary to teach and assess against Blue - aspirational vocabulary	**Animals, including humans** Mouth, Tongue, Teeth, Stomach, Predator, Prey, energy, Oesophagus, Small Intestine, Large Intestine, anus, rectum, saliva, Herbivore, Carnivore, Canine, Incisor, Molar, Producers, Consumer (primary & secondary), decay, digestion, digestive system, Salivary glands, Chemical enzymes, Gastric (stomach) acid, enamel,	**States of matter** Temperature, Freezing, Heating, melting, cooling Solid, Liquid, Gas, Evaporation, Condensation, Particles, Water vapour, Water cycle, Precipitation, container, changing state, thermometer, Boiling point Solidify, Transpiration **Sound** Volume, Speaker, sound, travel, ear, loud, quiet, Vibration, sound wave, Pitch, sound source, vibrate, echo, tune, decibels, medium, Insulation, strength of vibration, reflection of sound, ear drum, amplitude, **Electricity** Electricity, Battery, Bulb, lamp, plug Mains, power, Cells, Wires, Switches, Buzzers, Circuit, Series, Conductors, Insulator, series circuit, open and closed circuit, positive, negative Voltage, volt	**Living things and their habitats** animals, fish, reptiles, mammals, birds, insects, amphibians, plants, habitats, life processes vertebrates, invertebrates, flowering, non-flowering, environment, environmental change, human activity, classification, classification keys, global warming, deforestation, urbanisation, nature reserves taxonomy, ecosystem, ecology, , microorganisms

Y4 ENQUIRY SKILLS			
	Observing Over Time  How does an egg shell **change** when it is left in cola/different drinks/liquids? (to observe closely) Pattern Seeking  Are foods that are high in energy always high in sugar? (interpret results and draw conclusions) Identifying, Classifying and Grouping  Can you identify the names for all the organs involved in the digestive system? (to observe closely)	Comparative and Fair Testing  Do gases weigh anything? (added by EL & SH) (to interpret results) Which material is best to use for **muffling sound** in ear defenders? (plan an enquiry) How does the volume of a drum change as you move further away from it? (to gather/record results) Which metal is the best conductor of electricity? (plan an enquiry) Identifying, Classifying and Grouping  Can you group these materials and objects into solids, liquids, and gases? (to ask scientific questions) Observing Over Time 	Research Using Secondary Resources  How do nature reserves positively affect the environment? Can we use classification keys to group the animals/plants we have found in our school outdoor environment? (observing closely) Pattern Seeking  How has the use of insecticides affected the bee population? (interpret results/draw conclusions)

		How does the level of water in a glass change when left on the windowsill? (to gather/record results) (to interpret results) Pattern Seeking  Which room has the most electrical sockets in a house? (to make a prediction) Research Using Secondary Resources  How has electricity changed the way we live?	

Y4 Working Scientifically (Disciplinary Knowledge)

PLAN			DO			REVIEW		
Ask scientific questions 	Plan an enquiry 	Make a prediction 	Observe closely 	Take measurements 	Gather/record results 	Present results 	Interpret results/draw conclusions 	Evaluate an enquiry 

Y 4 Progression of Skills

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

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

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

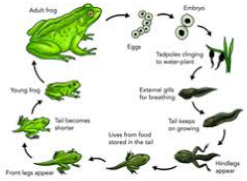
recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

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

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

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

using straightforward scientific evidence to answer questions or to support their findings

Year 5			
Y5 THEME	**Autumn term** Life Cycles - The Circle of Life Living things and their Habitats Animals, including Humans 	**Spring term 1** Natural Disasters; Why is our Earth so volatile? Properties and changes of materials  **Spring term 2** Why leave Earth? Earth and Space 	**Summer term 1** May the force be with you! Forces 
Y5 National Curriculum Programme of Study	Living things and their Habitats LT1 describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	Properties and changes of materials PM1 compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity	Forces F1 explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

END POINTS	LT2 describe the life process of reproduction in some plants and animals. Animals, including Humans AIH 1 describe the changes as humans develop to old age.	(electrical and thermal), and response to magnets PM2 know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution PM3 use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating PM4 give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic PM5 demonstrate that dissolving, mixing and changes of state are reversible changes PM6 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. Earth and Space ES1 describe the movement of the Earth, and other planets, relative to the Sun in the solar system	F2 identify the effects of air resistance, water resistance and friction, that act between moving surfaces F3 recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

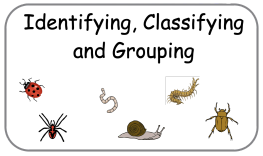
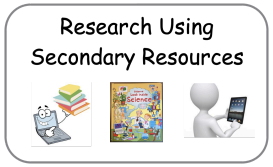
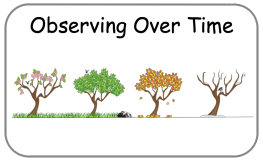
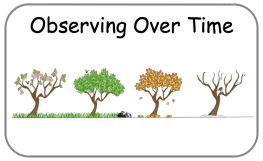
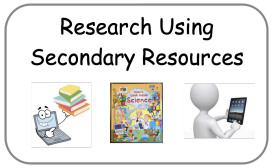
		ES2 describe the movement of the Moon relative to the Earth ES3 describe the Sun, Earth and Moon as approximately spherical bodies ES4 use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
Y5 Substantive Knowledge and SPECIFICS	Animals, including Humans *Changes happen as **humans** develop from babies to old age:* *Foetus, embryo, babies, toddler, children, teenagers, adults, eldery* ***Changes experienced in puberty (Link to RSE) - LIGHT TOUCH HERE*** *Changes when a body develop into and adult body capable of reproduction. Hormones control these changes and are physical and emotional* *Males: enlarged scrotum and testes, pubic hair, hair of chest, face, legs and underarm, voice deepens Females: hips widen, breasts develop, pubic hair, hair & underarm, periods start* Living things and their Habitats	Properties and changes of materials *Materials change state by heating and cooling (link to previous learning about water cycle etc)* *Dissolving, mixing and changes of state are reversible changes.* *Mixtures can be separated using different methods depending on whether they are soluble or insoluble.* *Some solid materials are **soluble and will dissolve** in liquid- it will form a solution.* *Sometimes a substance can be recovered from a solution through **evaporation** (eg salt in water)* *Some changes result in the formation of new materials, and this kind of change is usually not **reversible**. Sometimes mixed substances react to make a new substance. (the action of acid on bicarbonate of soda) These changes are usually **irreversible.***	Forces *Forces make things begin to move, get faster or slow down.* *Unsupported objects fall towards the Earth because of the force of **gravity** acting between the Earth and the falling object. (link back to earth and space)* ***Friction** is a force that slows or stops moving objects and is caused by two surfaces rubbing against each other.* ***Air resistance and water resistance** are forces against motion caused by objects having to move air and water out of their way.* *Some objects require large forces to make them move; **gears, pulley and levers** can reduce the force needed to make things move. They allow a smaller force to have a greater effect.*

	Life cycle of *:* ***Amphibian*** *(eggs/spawn; tadpoles (gills), frogs (lungs)* ***Reptiles*** *(eggs, hatchling, juvenile adult)* ***Birds*** *(egg, hatchling, chick, bird)* ***Fish*** *(egg, larva, fry, juvenile, adult)* ***Insect*** *(egg, larva, pupa, adult)* *Different animals have different gestation periods* *Most organisms reproduce* ***sexually*** *where offspring inherit information from both parents. Some organisms reproduce* ***asexually*** *by making a copy of a single parent (starfish, komodo dragons, sharks, wasps, ants)* *Plants can reproduce* ***sexually*** *- pollination and fertilisation (from year 3)* *Some plants reproduce* ***asexually*** - ***artificial*** *- produce roots from cuttings* - ***natural*** *- bulb, tumour, runner* Butterfly Frog Fairy wasp	***Heating*** *can sometimes cause materials to change permanently. (changes associated with burning) When this happens, a new substance is made. (wood to charcoal) These changes are irreversible.* ***Indicators that something new has been made are:*** - *The properties of the material are different (colour, state, texture, hardness, smell, temperature)* - *If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change)* ***When two or more substances are mixed*** *and remain present (a mixture of different sized solids or an insoluble solid and a liquid) the mixture can be separated using sieving (sand and soil), filtering (tea leaves and tea), floating (oil and water) or using magnets (iron pieces in sand).* ***Everyday materials can be grouped and compared according to their properties****, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.* Earth and Space *The* ***sun*** *is the star at the centre of our solar system.*	

		*The solar system has eight **planets**: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.* *The Sun, Earth and Moon are approximately **spherical bodies.*** *Stars produce vast amounts of heat and light.* *All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.* *Stars, planets and moons have so much mass they attract other things, including each other due to a **force called gravity.** Gravity works over distance. (link to forces learning)* *Objects with larger masses exert bigger gravitational forces. Smaller mass objects like planets orbit large mass objects like stars.* *Celestial objects like planets, moons and stars spin.* *The Earth orbits (goes around) the Sun and it takes 1 year to complete its orbit. The Earth is held in its orbit around the Sun by the Sun's gravitational pull.* *The other planets in our solar system also orbit the sun but at different speeds so their 'year's are different lengths to ours.* *A moon is the celestial body that orbits a planet*	

		The Earth has one moon; Jupiter has four Moons and numerous small ones *The Moon orbits the Earth and it takes about 28 days for the Moon to complete its orbit.* *The Moon is held in its orbit by Earth's gravitational pull.* *The moon DOESN'T change shape. It appears to change shape because we cannot always see the side of the Moon that's in sunlight or we can only see part of the sunlit side of the Moon as it orbits Earth.* *The Earth spins on its own axis and takes 24 hours (1 day) to completely rotate.* *The side of the Earth facing the Sun is in daytime and the side of the Earth facing away from the Sun is night time.* *The Sun doesn't move – it is us that moves. The solar system is heliocentric but in the past we thought it was geocentric. Because the Earth is rotating, the sun appears to move across the sky as the day goes on. (link to y3 light)*	
Y5 Vocabulary Yellow - words most children will already know	Living things and their Habitats Insect, Bird, Mammal,Amphibian, Animal, Plant, Lifecycle, Young, Parent, seed, pollen Offspring, reproduction, species, metamorphosis, stamen, stigma, filament, style, ovary, pollination, sexual/asexual, reproduction, gestation, germination, seed disperasal	Properties and changes of materials Hardness, Dissolving Magnetic Mixing, burning, sieving, liquid, vinegar, salt separate, Solubility, Solution, Soluble, Transparency, Conductivity, Filter, Evaporation, Condensation, Reversible and irreversible changes, bicarbonate of soda	Forces Force, push, pull, surface Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, Levers, accelerate, opposing, streamline decelerate

Green - new vocabulary to teach and assess against Blue - aspirational vocabulary	endothermic, botanical, parasitic **Animals, including Humans** Baby, Toddler, Teenager, Young, Elderly, Growth, Foetus, Embryo, Womb, Development, Puberty, Gestation Chromosomes, Fallopian tubes	Distillation, chemical reaction, combustion **Earth and Space** Earth, Sun, Moon, Day, Night, star, planets, shadow Axis, Rotation,rotate, Phases of the Moon,constellation, sphere, names of planets, orbit, universe celestial body, asteroids, satellite	
Y5 ENQUIRY SKILLS	Observing Over Time  How do frogs **change over** their lifetime? (observe closely) Comparative and Fair Testing  How does age affect a human's reaction time? (to make a prediction) Pattern Seeking 	Comparative and Fair Testing  What factors affect the speed at which solids dissolve in water? (plan an enquiry) How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction? (gather/record results) Is there a pattern between the size of a planet and the time it takes to travel around the Sun? ((to make a prediction) Identifying, Classifying and Grouping  Can you identify and classify these reactions and changes into reversible, and irreversible?	Comparative and Fair Testing  How does the surface area of an object affect the speed of a toy car? (plan an enquiry) Pattern Seeking  How does the surface area of a parachute affect the time it takes to fall? (take measurements and gather/record results) Identifying, Classifying and Grouping 

	Is there a relationship between a mammal's size and its gestation period? (interpret results and draw conclusions) (present results)  Can you **compare** this collection of animals based on similarities and differences in their lifecycle? (ask scientific questions)	Describe similarities and differences. (observe closely) Can you identify the best methods to separate mixtures? (interpret results and draw conclusions)  What are microplastics and why are they harming the planet? What are smart materials and how can they help us? How have our ideas about the solar system changed over time?  Can you observe and identify all the phases in the cycle of the Moon? (ask scientific questions/gather and record results)	Can you label and name all the forces acting on the objects in each of these situations? (observe closely)  How long does a pendulum swing before it stops? (evaluate an enquiry)  How do submarines sink if they are full of air?

Y5 Working Scientifically (Disciplinary Knowledge)

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Y5 Progression of Skills

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

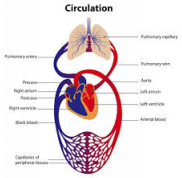
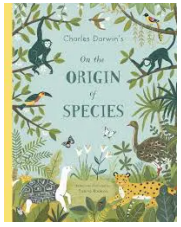
taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments

Year 6			
Y6 THEME	**Autumn term 1** The Circulatory System - Have a Heart Animals, including Humans 	**Spring Term** Voyage of Discovery! Evolution and Inheritance Living things and their Habitats 	**Summer term 2** Victorians Light Electricity
Y6 National Curriculum Programme of Study **END POINTS**	Animals, including Humans AIH1 identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood AIH2 recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function AIH3 describe the ways in which nutrients and water are transported within animals, including humans.	Evolution and Inheritance EI1 recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago EI2 recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents EI3 identify how animals and plants are adapted to suit their environment in	Light L1 recognise that light appears to travel in straight lines L2 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 L3 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

		different ways and that adaptation may lead to evolution. Living things and their Habitats LTH1 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 LTH2 give reasons for classifying plants and animals based on specific characteristics.	L4 use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. Electricity E1 associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit E2 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 E3 use recognised symbols when representing a simple circuit in a diagram.
Y6 Substantive Knowledge and SPECIFICS	Animals, including Humans *The heart has 4 chambers. The heart pumps blood around the body.* *Oxygen is breathed into the lungs where it is absorbed by the blood.* *The heart pumps the blood around the body through blood vessels to the muscles.*	Evolution and Inheritance *Living things produce offspring of the same kind but they vary and are not identical to their parents.* *Over time the characteristics that are most suited to the environment become increasingly common. Animals and plants are adapted to suit their environment. Adaptation may lead to evolution.*	Light *Light travels in straight lines.* *Animals see light sources when light travels from the source into their eyes. Animals see objects when light is reflected off that object and enters their eyes.* *Light reflects off all objects, unless they are black.*

	The oxygen in the blood provides energy for our bodies. *Blood which carries oxygen from the lungs into the heart is **oxygenated**.* *Blood which has delivered the oxygen to the muscles and goes back into the heart and then lungs, is **deoxygenated*** *Blood carries nutrients throughout the body, it transports and gives oxygen to the body, and prevents you from getting sick!* ***Arteries**: blood vessels which carry blood **AWAY** from the heart* ***Veins**: blood vessels which carry blood **TOWARDS** the heart* ***Alveoli**: These are air sacs in the lungs which are surrounded by capillaries to allow the transference of gas* ***Capillaries**: small blood vessels which connect arteries and veins* ***Diet, exercise and lifestyle impacts on the way bodies function.*** ● *Smoking: Nicotine and chemical cause any diseases (heart disease and cancer). It affects the gas exchange in the lungs.* ● *Diet: fatty foods (unsaturated fats) raises cholesterol and causes heart disease*	*Life cycles have evolved to help organisms survive to adulthood.* *The theory of evolution is the process by which different kinds of living organism are believed to have developed from earlier forms during the history of the earth* *Living things have changed over time and fossils provide information about living things that inhabited the Earth millions of years ago.* *Fossils can be used to find out about the past - Fossils of the simplest organisms are found in the oldest rocks, and fossils of more complex organisms in the newest rocks.* Living things and their Habitats *Living things can be classified into groups based on characteristics and similarities and differences.* *Broad groupings (micro-organisms, plants, animals) can be subdivided (commonly found invertebrates - insects, spiders, snails, worms - and vertebrates - fish, amphibians, reptiles, birds, mammals). This can become more and more specific.* *Organisms best suited to their environment are more likely to survive long enough to reproduce.* *Organisms that are best adapted to reproduce are more likely to do so. Organisms reproduce and offspring have similar characteristic*	*Non-shiny surfaces scatter the light so we don't see the beam. Reflection changes the direction in which the light travels.* *Shadows have the same shape as the objects that cast them because light travels in straight lines and is stopped by the object.* *Optical instruments are used to reflect and refract light to form images. They can make enlarged images of distant or small objects. e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.* Elecricity *Batteries are a store of energy. This energy pushes electricity around the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'* *More batteries (more voltage) will push the electricity round the circuit faster.* *Devices work harder when more electricity goes through them. (volume of buzzer, brightness of lamp)* *Current is how much electricity is flowing round a circuit. Electric current can only flow in one direction.* *When current flows through wires heat is released. The greater the current, the more heat is released.* *Resistors (bulbs, buzzers, motors etc) use energy. The more resistors in a circuit, the less energy*

	• *Exercise and heart rate:Improve muscle strength and help the cardiovascular system work efficiently* • *Alcohol: lead to cancers, heart disease, digestive problems. It is also linked to mental health difficulties, such as depression and anxiety.* Heart, lungs, blood components link to asthma and BHF	*patterns. Competition exists for resources and mates.* Galpogos animals including the Galapogos Penguin, Vampire Finch, Fourwing saltfish, whale fish, green sea lettuce, prickly pear cactus, daisy tree All based on Charles Darwin's voyage	*there is for each of them to use. E.g. two bulbs will shine less brightly than one bulb. Using more cells or batteries will increase the energy available.* *Symbols are used to represent components of a simple circuit.*
Y6 **Vocabulary** Yellow - words most children will already know Green - new vocabulary to teach and assess against Blue - aspirational vocabulary	Animals, including Humans Heart, Blood, skeletal, muscular, digestive, oesophagus, small intestine, large intestine Vessels, Veins, Arteries, Valve, Exercise, Respiration, Circulatory oxygenated, deoxygenated, diffusion, osmosis	Living things and their Habitats Amphibians, Reptiles, Mammals, Insects, Vertebrates, Invertebrates, habitats Micro-organisms, Classification Bacteria, key, species Linneneum, arachnid, mollusc, taxonomist Evolution and Inheritance fossils, reproduction , survival, offspring, similarities, differences Adaptation, Evolution, variation , inheritance, parasitic, non identical, identical , environment, conditions , characteristics climate organism Genetics, Survival of the fittest, DNA	Light Light , Reflection, reflective, absence, surface, solid, shadows, light sources,protection, Refraction, Spectrum , angle of incidence, rainbow Parts of the eye - sclera, pupil, lens, optic nerve, cornea, retina Electricity Bulbs, Batteries , Wires Switches, Buzzers, Circuit, Series, Conductors, Insulators, Cell , Amps, Volts, component, crocodile clip , series resistance, current, Parallel Circuit

Y6 ENQUIRY SKILLS	Observing Over Time  How does my heart rate **change over** the day? (to take measurements and to gather/record results) Comparative and Fair Testing  Which type of exercise has the greatest effect on our heart rate? (to plan an enquiry) Pattern Seeking  Can exercising regularly affect your lung capacity? (interpret results)	Identifying, Classifying and Grouping  How would you make a classification key for vertebrates/ invertebrates or microorganisms? (observe closely) Compare the skeletons of apes, humans, and Neanderthals – how are they similar, and how are they different? (asking scientific questions) Pattern Seeking  Do all flowers have the same number of petals? (interpret results/draw conclusions) Is there a pattern between the size and shape of a bird's beak and the food it will eat? (making a prediction) Research Using Secondary Resources  What do different types of microorganisms do? Are they always harmful?	Comparative and Fair Testing  Which material is most reflective? (to gather/record results) How does the voltage of the batteries in a circuit affect the brightness of the lamp/the volume of the buzzer? (to make a prediction) Research Using Secondary Resources  Why do some people need to wear glasses to see clearly? Identifying, Classifying and Grouping  How does light travel? (observe closely) Observing Over Time  How does the brightness of a bulb change as the battery runs out? (to ask

		What are the 3 main epochs of fossils?	scientific questions

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Y6 Progression of Skills

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