SCIENCE
WHOLE SCHOOL OVERVIEW

St Francis Roman Catholic Primary School

SCIENCE STATEMENT OF INTENT

At St Francis we aim to give all children a strong understanding of God's world whilst acquiring specific skills and knowledge to help them to think scientifically. We want them to gain an understanding of scientific processes and implications of Science, today and for the future.

Our science curriculum is ambitious and inclusive for ALL children.
Scientific enquiry skills are embedded in each topic the children study and these topics are revisited and developed throughout their time at school. Topics, such as Plants, are taught in Key Stage One and studied again in further detail throughout Key Stage Two. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding procedural knowledge into the long-term memory.
All children are encouraged to develop and use a range of skills including reading, observations, planning and investigations. They are encouraged to independently question the world around them and explore possible answers for scientific based questions.

Scientific vocabulary is explicitly taught and there is an expectation that children will use appropriate terminology. Effective questioning to communicate ideas is encouraged.

THE GOLDEN THREADS OF EYFS
UNDERSTANDING THE WORLD

NURSERY

Staff provide interesting natural environments for children to explore freely outdoors. Collections of natural materials are investigated and talked about such as contrasting pieces of bark, different types of leaves and seeds, different types of rocks and different shells and pebbles. Staff model observational and investigational skills, they ask out loud: "I wonder if…?". Children are shown and taught the concepts of growth, change and decay with natural materials such as planting seeds and bulbs, so children observe growth and decay over time. Children's attention is drawn to forces such as 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.

Children are given opportunities to change materials from one state to another such as cooking – combining different ingredients, and then cooling or heating, as well as melting – leaving ice cubes out in the sun and seeing what happens when you shake salt onto them. We explore how different materials sink and float and how you can shine light through some materials, but not others. Vocabulary is planned and introduced related to these explorations and children are encouraged to use it.

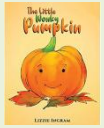
KEY KNOWLEDGE AND SKILLS

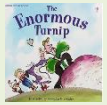
- Talk about the differences between materials and changes they notice (UTW).
- 3
- Explore and talk about different forces they can feel (UTW).
- Plant seeds and care for growing plants (UTW).
- Begin to understand the need to respect and care for the natural environment and all living things (UTW).

WHAT THIS LOOKS LIKE

- Adult-led activities where children observe melting and exploring ice during the winter months.
- Child-led exploration such as; mixing water and sand or exploring forces, floating and sinking using different objects within the water area and observing how the water pushes up when they try to push a plastic object under it.
- Planting cress seeds, observing their growth, making comments about their observations over time, eating cress plants.
- Carefully planned enhancement; children make bird feeders out of oranges.
- Continuous repeated experiences during the outdoor provision, including exploration of seasonal changes.

KEY TEXTS





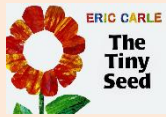
KEY VOCABULARY (EYFS)

living, not living, alive, dead, seeds, plants, grow, change, float, sink, day, night, push, pull, melt, Autumn, Winter, Spring, Summer, season, lifecycle

RECEPTION

Reception	Autumn Term	Spring Term	Summer Term
	TOPIC- I wonder why the leaves are not green. CC links C&L: learns new vocabulary, ask questions to find out more	**TOPIC- What happens to our world during Spring?** CC links C&L: learns new vocabulary, ask questions to find out more. We're going on a bear hunt- Geography mapping. RE: 'growing'.	**TOPIC- How do some living things grow?** CC links C&L: learns new vocabulary, ask questions to find out more
	Children have frequent opportunities for outdoor play and exploration. Staff encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. Children have the opportunity to explore light and shadows. Children are guided towards noticing the weather and seasonal features and are provided with opportunities to note and record the weather. Children are taken outside to observe the natural world and encouraged to observe how animals behave differently as the seasons change. Children investigate the following: • Why are the leaves not all green? • Will the trees grow more leaves? • Where is the best place to melt ice? • How is the sky different in the day and the night? • What objects make their own light?	Children have frequent opportunities for outdoor play and exploration, children to notice the effect their play and exploration has on their bodies. Staff encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. We encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in. Children are guided towards noticing the weather and seasonal features and are provided with opportunities to note and record the weather. Children are taken outside to observe the natural world and encouraged to observe how animals behave differently as the seasons change. Children investigate the following: • What living things did we find on the bear hunt? • What happens when we jump? • What happens when we run fast?	Children have frequent opportunities for outdoor play and exploration. Staff encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. We create opportunities to discuss how we care for the natural world around us and sing songs and join in with rhymes and poems about the natural world. After close observation, children draw pictures of the natural world, including animals and plants. We encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in. Children are guided towards noticing the weather and seasonal features and are provided with opportunities to note and record the weather. Children are taken outside to observe the natural world and encouraged to observe how animals behave differently as the seasons change.

			Children investigate the following: • What does the hungry caterpillar like to eat? • How does the caterpillar grow and change? • What do caterpillars need to do to grow into butterflies? • What does a seed need to grow?
	KEY KNOWLEDGE& SKILLS	**KEY KNOWLEDGE& SKILLS**	**KEY KNOWLEDGE& SKILLS**
	• Describe what they see, hear and feel outside (UTW). • Explore the natural world around them (UTW). • Understand some important processes and changes in the natural world around them (UTW).	• Explore the natural world around them (UTW). • Understand some important processes and changes in the natural world around them (UTW).	• Make observations and drawings of animals and plants. • Explore the natural world around them (UTW) • Understand some important processes and changes in the natural world around them (UTW).
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that the leaves change colour in Autumn. • Know that the weather changes in Autumn. • Know that when ice heats up, it melts. • Know the difference between the sky at night and during the day. • Know that some objects create light.	• Know that plants grow again in spring. • Know what it means to grow. • Know that some animals live in the woods. • Know some things that happen to our bodies when we move.	• Know the lifecycle of a caterpillar. • Has an awareness of what seeds need to grow.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	grow, change, day, night, light, Autumn, Winter, season, melt, weather	change, Spring, season	living, not living, alive, dead, seeds, plants, grow, change, day, night, Summer, season, lifecycle
	KEY TEXTS	**KEY TEXTS**	**KEY TEXTS**



KS1-We are Young Scientists – All Topics

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.
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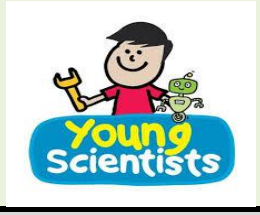
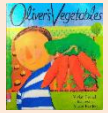
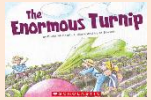
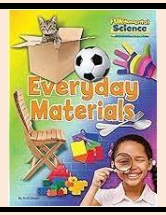
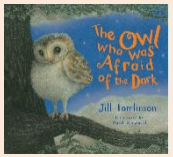
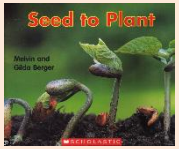


YEAR ONE

1	Autumn Term	Spring Term	Summer Term
	TOPIC – Animals including humans DT Hedgehogs	**TOPIC – Everyday Materials** CC links History 'Toys'	**TOPIC – Plants** CC links English texts 'Oliver's Vegetables' 'The Enormous Turnip'
	Children recap on previous knowledge of body parts from EYFS. They name the parts of the human body. They learn about the senses and which part of the body is associated with each sense. 'Animal Magic' come into school and the children have an opportunity to learn about different animals they would not usually be able to see. Children complete the following investigations: • What are the names for all parts of our bodies? • They will research 'Do all animals have the same senses as humans?'	Children recall their learning from EYFS where they explored natural materials. This is developed further in Y1 and children investigate a wide variety of materials and sort them according to their properties. Children complete the following investigations: • We need to choose a material to make an umbrella. Which materials are waterproof? • What happens to materials overtime if we bury them in the ground? • Which materials can be recycled?	After recalling previous knowledge of planting daffodils and sunflowers in EYFS, the children use the school environment to learn about common plants and trees. They label a basic plant. They investigate which plants grow in which places and why. They observe, sketch and collect a variety of plants and flowers with adult supervision. They tend to their own garden in the Year 1 outdoor area. Children investigate the following questions: • Which tree has the biggest leaves? • How does my sunflower change each week? • Is there a pattern in where we find moss growing in the school grounds?

	KEY KNOWLEDGE& SKILLS:	**KEY KNOWLEDGE& SKILLS:**	**KEY KNOWLEDGE& SKILLS:**
	• identify and name a variety of common animals including fish, amphibians, reptiles, birds and describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. • mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores	• distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees.
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know the parts of the human body. • Know that the five senses of the human body are touch, sight, smell, taste and hearing. • Know that carnivores are animals that eat other animals, herbivores are animals that eat only plants and omnivores eat plants and animals.	• Know that cloth is absorbent and soaks up the most water. • Know that waterproof materials do not let water pass through. • Know that materials can be grouped according to their properties. • Know that objects are made from one or more materials.	• Know that there are different types of trees and plants • Know that deciduous trees lose their leaves in autumn every year. • Know that evergreen trees have green leaves all year round. • Know what the main parts of a tree and a plant are.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	head eyes mouth leg wing fin feathers beak hooves body ears teeth tail claw scales fur paws hair	hard stretchy bendy waterproof breaks rough Shiny see through soft stiff floppy absorbent tears smooth dull not see through	leaf flower petal fruit root seed trunk branch stem bark
	KEY TEXTS	**KEY TEXTS**	**KEY TEXTS**
			 
	YEAR TWO		

	Autumn Term	Spring Term	Summer Term
2	**TOPIC – Everyday Materials**	**TOPIC – Animals including Humans** CC links English – 'The Owl Who Was Afraid of the Dark'	**TOPIC -Plants**
	Children recall previous learning in EYFS where they looked at changes in materials. Children revisit work on everyday materials completed in Y1. They build on this knowledge and look at the common purposes of everyday materials and why they are suited to particular functions. They investigate whether materials are changeable and classify objects into whether or not their shape can be manipulated. Children investigate the following: • Which material would be best for an astronaut's towel? • Which material would be the best for the roof of the little pig's house? • Which materials are shiny and which are dull? • Would a paper boat float forever? •	Children recap knowledge taught in EYFS – basic lifecycles. They learn about human and animal offspring and how they grow into adults. They look at the basic needs of humans and animals.. Children investigate the following: • Which offspring belongs to which animal? • Do all animals have the same senses as humans?	Prior knowledge from Y1 is recalled. During this topic, the children grow their own plants from seeds or bulbs. with children investigating what plants needs in order to survive and grow. The children investigate the following: • What happens to my bean after I have planted it? • Do bigger seeds grow into bigger plants?
	KEY KNOWLEDGE& SKILLS	**KEY KNOWLEDGE& SKILLS:**	**KEY KNOWLEDGE& SKILLS:**
	• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	• notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.	• observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that materials have different uses according to their properties	• Know that animals including humans have offspring that grow into adults.	• Know that plants can grow from seeds or bulbs. • Know that some plants grow quickly and some more slowly.

	• Know that materials can be changed by squashing, bending, stretching and twisting.	• Know that all animals including humans need food, water, shelter and air to live and that these are called basic needs. • Know that to grow into healthy adults, animals including humans need exercise, good hygiene and the right amount and type of food.	• Know that plants need water, space and a suitable temperature to grow. • Know that different types of plants need different conditions to stay healthy.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	transparent translucent opaque flexible rigid reflective non-reflective absorbent non-reflective absorbent	offspring growth exercise breathing hygiene germs disease living dead never been alive habitat micro-habitat food chain	seed bulb seedling bud flower fruit berry root
	KEY TEXTS	**KEY TEXTS**	**KEY TEXTS**
			
	TOPIC –Living things and their habitats		
	CC links Data handling (Autumn 2) Geography Oceans and Seas (Autumn 2) The children recall their farm trip in EYFS and Zoo trip in Year 1 as an introduction to animals and their habitats. The children look at habitats and why they are suited to different creatures. They investigate how plants and animals are co-dependent. They use a 'bug hotel' to investigate the habitats of a range of minibeasts. Children investigate the following: • What conditions do woodlice prefer to live in? • Which habitat do worms prefer – where can we find the most worms		
	KEY KNOWLEDGE & SKILLS:		
	• 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
- 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.

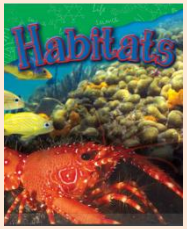
KEY STICKY KNOWLEDGE

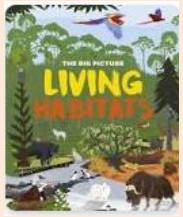
- Know that there are different habitats, such as ocean, forest, seashore, pond, polar.
- Know that there are micro habitats and where we can find them, leaf litter, under stones, under logs and shrubs.
- Know what a food chain is and give an example of on.

KEY VOCABULARY

Living dead never been alive habitat micro-habitat food chain

KEY TEXTS





KS2-Developing Scientific Minds – All Topics

- 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 • 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.
3	**YEAR THREE**

Autumn Term	**Spring Term**	**Summer Term**
TOPIC –Rocks and Fossils CC links History –'The Stone Age'	**TOPIC – Animals Including Humans** CC links Healthy Eating PSHE (summer 1)	**TOPIC – Plants**
The children sort and classify rocks and describe their simple properties. They learn the terms for the three different types of rock; sedimentary, metamorphic and igneous. They learn about how fossils are formed. Children find out if there a pattern in where we find volcanoes on planet Earth. They will research the scientist Mary Anning and find out what she discovered.	Building from their Y1 knowledge of naming body parts, the children investigate the human skeleton and learn the names of the major bones in the body. The learn about how animals and humans gain nutrition from food and the basics of the food chain. Children investigate the following: • How does the height of a girl compare with that of a boy? • They will think about how they can group the food that they eat?	The children recall their learning from Y1 and Y2 naming basic parts of a plant and what they need to grow. They go on to learn about the functions of different parts of the plant. They explore the requirements of plants for life and how water is transported within in a plant. They explore the function of the flower in the plant. Children plan and carry out an investigation to find out what happens to celery when it is left in a glass of coloured water.
KEY KNOWLEDGE & SKILLS:	**KEY KNOWLEDGE & SKILLS:**	**KEY KNOWLEDGE & SKILLS:**
• 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	• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.	• 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

	• recognise that soils are made from rocks and organic matter.		• investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that the property of soils is affected by types of rock, size of rock pieces, and organic matter. • Know that fossils were formed millions of years ago. • Know that there are different types of rock: sedimentary, igneous and metamorphic. • Know how to describe rocks using language such as texture, layers grains.	• Know that animals need to eat food to get the nutrients they need. • Know that One piece of food can provide a range of nutrients. • Know that the skeleton has two functions, protection and support. • Know that the skull protects our brain.	• Know that plants need certain things to grow: air, water, room to grow, nutrients from the soil. • Know how plants take in water. • Know what pollination is. • Know and can describe the different methods of seed dispersal: wind, animals eating them, animals fur, explosion and water.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	rock fossil soil	nutrition nutrients carbohydrates proteins vitamins and minerals fibre skeleton bones muscles joints	roots stem/trunk leaves photosynthesis pollen pollination seed formation seed dispersal germination
	TOPIC – Forces & Magnets		**TOPIC - Light**
	Children investigate a range of magnets and magnetic objects. They sort materials on the basis of whether they are attracted to magnets and create theories about why certain materials are magnetic. They learn about magnetic poles. Children investigate the following: • Find out which magnet is strongest • Which materials are magnetic?		Children learn about light and sources of light. They investigate reflection and shadows. They test materials to see if they are reflective and investigate light sources to see which provides the strongest light. Children investigate the following: • How does the distance between the shadow puppet and the screen affect the size of the shadow? • When is our classroom darkest? • How does the sun make light?
	KEY KNOWLEDGE& SKILLS:		**KEY KNOWLEDGE& SKILLS:**

	• 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.		• 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 size of shadows change.
	KEY STICKY KNOWLEDGE		**KEY STICKY KNOWLEDGE**
	• Know that a force is a push or a pull. • Know how objects move on surfaces. • Know that magnets have two poles and opposite poles attract. • Know that materials can be sorted into magnetic and non magnetic items and give examples of each.		• Know that we need light to see things. • Know that the sun can damage our eyes. • Know that shadows are formed when an opaque object blocks the light. • Know thatshiny surfaces reflect light very well. • Know that matt surfaces do not reflect light well.
	KEY VOCABULARY		**KEY VOCABULARY**
	force magnetic force magnet attract repel poles contact force non-contact force		light dark light source transparent translucent opaque shadow reflect mirror

YEAR FOUR

	Autumn Term	Spring Term	Summer Term
4	**TOPIC – Animals including Humans.** CC links – Art Andy Warhol self-portraits' CC links- PSHE Physical Health and Fitness-Summer 2	**TOPIC – States of Matter** **CC links Rainforests (watercycle)**	**TOPIC – Sound** **CC links - Music**

	Building up from naming body parts in Year 1 and their knowledge of the skeleton in Year 3, the children now learn about the digestive system in humans. They also investigate teeth and look at the effect of different substances on teeth using egg shells. They learn the names and the functions of the different teeth. They have a dental workshop in school. Children investigate the following: • In our class, are omnivores taller than vegetarians? • Are foods that are high in energy always high in sugar? • How do dentists fix broken teeth?	Children recap on on the everyday materials topic in Y2 where they leant about common purposes of everyday materials. They identify solids, liquids and gases and investigate how materials can change form by being heated or cooled. They investigate reversible and irreversible change. Children investigate the following: • How does the surface area of a container of water affect how long it takes to evaporate? • How does an egg shell change when it is left in coca cola? • Which material is best for keeping hot chocolate warm? • Is there a pattern in how long it takes different sized ice lollies to melt?	During this topic the children investigate how different sounds are made through vibrations and how they travel through the ear. They investigate tone and pattern of sound and how sounds get fainter the further away you travel. Children investigate the following: • Are two ears better than one? • How does the volume of a drum change as you move further away from it?
	KEY KNOWLEDGE& SKILLS:	**KEY KNOWLEDGE& SKILLS:**	**KEY KNOWLEDGE& SKILLS:**
	• 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.	• compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• 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.
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that humans have four types of teeth, molars, incisors, canines and premolars. Be able to describe what the teeth types are used for. • Know the main parts of the digestive system. • Know what a food chain is and orally describe one.	• Know the properties of solid, liquids and gases. • Know what evaporation is. • Know what condensation is. • Know the events of the water cycle and describe the water cycle. • Know the freezing and boiling points of water.	• Know that the loudness of a sound depends on the vibrations. • Know that a source is producing sound when some part of it is vibrating. • Know that sound can travel through solids and liquids as well as air. • Know that the nearer we are to the sound source, the louder it will be.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**

	digestive system digestion herbivore carnivore omnivore producer consumer predator prey food chain	change of state melting freezing melting point boiling point evaporation condensation water cycle temperature	sound sound source vibrations pitchvolume sound insulation
	TOPIC – Electricity CC link DT 3D models (Spring)		**TOPIC – Living things and their habitats**
	During this topic, the children learn how appliances and lights use electricity. They investigate simple circuits and recognise that if the circuit is broken the electricity will not work. They have a visit from United Utilities or Bright Sparks who explain how electric circuits work on a much larger scale. Children investigate the following: • Which metal is the best conductor of electricity? • How does a light bulb work?		Children recall their learning from Y2 and the habitats of different minibeasts. They use this knowledge to help sort and classify living things. They explore and use basic classification keys to help sort groups of living things according to their habitats. Children investigate the following: • Can we use the classification keys to identify all the animals that we caught pond dipping?
	KEY KNOWLEDGE& SKILLS:		**KEY KNOWLEDGE& SKILLS:**
	• identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors.		• 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.
	KEY STICKY KNOWLEDGE		**KEY STICKY KNOWLEDGE**
	• Know the difference between mains and battery. • Know that a circuit will not work if it is not complete. • Know the names of electrical components.		• Know that environments can change due to natural and human reasons such as deforestation, littering, setting up a nature reserve, tree planting. • Know how to use a classification key.

	• Know and give examples of conductors and insulators.		• Know that environments can change with the seasons, for example hedgehogs hibernate in winter.
	KEY VOCABULARY		**KEY VOCABULARY**
	electricity electrical appliance mains electrical circuit cell and battery electrical component switch conductor insulator		classification classification key environment habitat migrate hibernate vertebrates invertebrates
YEAR FIVE			
	Autumn Term	**Spring Term**	**Summer Term**
5 Topics	**TOPIC- Everyday Materials – Properties and changes of materials,** CC links DT weaving and sewing	**TOPIC –Living things and their Habitats**	**TOPIC-Earth and Space**
	Children recall and recap previous learning from the Y2 topic Everyday Materials and the Y4 topic States and their Matter. The investigate how substances can be dissolved and how substances can be recovered from a solution. They group everyday materials according to their properties using scientific vocabulary: solubility, transparency, conductivity (electrical and thermal), and response to magnets. They explore reversible and irreversible changes. Children investigate the following: • Which type of sugar dissolves the fastest? • How does the temperature of tea affect how long it takes for a sugar cube to dissolve? • How does a nail in salt water change over time? • What are micro plastics and why are they harming the planet?	The children begin this topic by recalling their knowledge from EYFS when they had the opportunity to find out about lifecycles of animals by observing caterpillars metamorphing into butterflies. The children then learn in more detail about life cycles of a variety of mammals, amphibians and insects as well as plants. They analyse the different plants and animals and suggest reasons for similarities and differences. They also learn about the work of naturalists and animal behaviourists- e.g. David Attenborough and Jane Goodall. Children investigate the following: • compare the collection of animals based on similarities and differences in their lifecycle, and investigate • Does a bean change as it germinates?’	The children learn about solar system and how the planets move around the sun. They investigate the movements of the moon. They learn how the rotation of the earth is responsible for night/day. They explore night and day in different areas of the world, understanding the effect of the sun on our world. Children investigate the following: • Is there a pattern between the size of a planet and the time it takes to travel around the sun? • How have our ideas about the solar system changed over time?

	KEY KNOWLEDGE& SKILLS:	KEY KNOWLEDGE& SKILLS:	KEY KNOWLEDGE& SKILLS:
	• compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	• 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.	• describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that materials can be separated by sieving, filtering and evaporating. • Know that materials can be grouped together according to their properties such as solubility, transparency, response to magnets, electrical conductivity, thermal conductivity, hardness and transparency. • Know the difference between reversible and non reversible changes.	• Know that plants reproduce both sexually and asexuallyand give examples of both. • Know the life cycles of examples of mammals, amphibians, insects and birds.	• Know that the sun is a ster at the centre of our solar system. • Know that the planets orbit the sun. • Know that the moon orbits the earth. • Know that the earth spins on its axis

	• Know that non reversible changes result in the formation of new materials.		
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	thermal insulator thermal conductor electrical insulator electrical conductor dissolve solution soluble insoluble sieve filter evaporation reversible change non-reversible change	life cycle reproduction sexual reproduction asexual reproduction fertilise metamorphosis runner bulb cutting tuber	Earth Sun Moon planets solar system star rotate orbit
		TOPIC- Animals including Humans CC links SRE PSHE	**TOPIC – Forces & Magnets**
		The children study life from birth to death and the changes that take place within the human body. They look at changes from birth to toddlers, children to teenagers, adults to old age. During this topic, they cover the Year 5 aspects of the SRE curriculum. Children investigate the following: • Is there a relationship between a mammal's size and its gestation period? • Why do people get grey/white hair when they are older?	Children recall their knowledge from Year 3 about magnetic materials and that magnetism is the force exerted by a magnet when they attract or repel each other. During this topic, the children investigate gravity. They study the scientists Galileo Galileli and Issac Newton to understand how they developed the theory of gravity. They experiment with different objects to see how air resistance/water resistance or friction may slow an object down. They explore the effect of levers, pulleys and simple machines on movement. Children investigate the following: • Which shape parachute takes the longest to fall? • How does the surface area of a container affect the time it takes to sink? • Can you label and name all the forces acting on the objects in each of these situations? • Do all objects fall through water in the same way?
		KEY KNOWLEDGE& SKILLS:	**KEY KNOWLEDGE& SKILLS:**
		• describe the changes as humans develop to old age.	• 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. •
		KEY STICKY KNOWLEDGE • Know that puberty usually begind between the ages of 8-14 • Know that larger animals usually have a longer gestation period than smaller animals. • Know that humans go througha variety of changes as they grow	**KEY STICKY KNOWLEDGE** • Know that gravity is a force that pulls things towards the ground. • Know that there are a variety of forces, including friction, air resistance and water resistance. Give examples of how these forces work. • Know that simple machines can make a task easier.
		KEY VOCABULARY puberty sexual reproduction menstruation (period) sperm egg foetus gestation life expectancy	**KEY VOCABULARY** force gravity force meter Newton (N) air resistance water resistance friction mechanisms simple machines

YEAR SIX

	Autumn Term	Spring Term	Summer Term
6 **5 Topics**	**TOPIC- Animals including Humans** CC link PSHE (summer 2)	**TOPIC- Electricity** CC link DT Fairgrounds (summer 2)	**TOPIC-Evolution and Inheritance**
	After recalling learning on the skeleton in Y3 and the digestive system in Y4, the children learn about circulation and the functions of the heart and blood. The children look at the impact of diet and exercise on the body and the importance of a healthy lifestyle. They have an opportunity to dissect a lamb heart to find the main parts and discover how	Children begin this unit by recalling their knowledge from the Year 4 electricity topic. They then experiment with different strengths of circuits and produce conclusions about the reasons for variations. They are given an opportunity to evaluate circuits, giving reasons why they will/won't work and why. They draw circuits using scientifically accurate diagrams. They design a burglar alarm system.	Children recall and recap their knowledge from the Year 3 rocks topic. They study evolution and how fossils give us information about life on earth millions of years ago. They look at how living things produce offspring but offsprings are not identical to their parents. They learn about basic genetics. They investigate how living things including humans adapt and evolve to their changing environment.

	blood travels through the heart and around the body. Children investigate the following: • Who has the greatest Lung capacity? • Find out which organs of the body make up the circulatory system, and where they are found.	Children investigate the following: • How the voltage of the batteries in a circuit affect the volume of the buzzer.	Children investigate the following: • Is there a pattern between the size and shape of a bird's beak and the food it will eat? • How have our ideas about disease and medicine changed over time?
	KEY KNOWLEDGE& SKILLS: • 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.	**KEY KNOWLEDGE& SKILLS:** • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram.	**KEY KNOWLEDGE& SKILLS:** • 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.
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**	**KEY STICKY KNOWLEDGE**
	• Know that the heart and lungs are part of the circulatory system. • Know that the circulatory systems transports nutrients and water in the blood to the body. • Know that our pulse rate increases when we exercise. • Know that smoking and alcohol are harmful. • Know that exercise is good for us.	• Know how to draw circuits correctly using circuit symbols. • Know that adding more cells to a circuit makes a bulb brighter. • Know that adding more bulbs to a circuit will make each bulb less bright.	• Know that living things produce off spring of the same kind. • Know thatfossils give us evidence of what lived on earth millions of years ago. • Know that plants and animals have characteristics which make them suitable to thew environment which they live in.
	KEY VOCABULARY	**KEY VOCABULARY**	**KEY VOCABULARY**
	Heart pulse blood blood vessels lungs circulatory system diet exercise drugs lifestyle	circuit circuit symbol circuit diagram cell battery swith voltage	Evolution offspring inherited characteristics Variation adapted environment species fossil

	TOPIC- Living things and their Habitats	TOPIC-Light CC link DT Fairgrounds (summer 2)
	Building on from the knowledge they acquired in Year 4 where they used classification keys, the children now develop their own classification keys based on observable features of living things. They give justifications why they classified plants and animals in the way that they have. They learn that micro-organisms can be helpful or harmful. They visit Bolton Museum to looked at the animal exhibits and continue their classification work in a different environment using preserved animals. Children investigate the following: What happens to a piece of bread if you leave it on the windowsill for 2 weeks?	Children begin this unit by recalling their knowledge from the Year 3 light unit. They recap sources of light and address the misconception that the moon is a source of light.The children investigate whether light travels in straight lines. They investigate how light travels using different objects such as a mirror to change the direction of the light. They investigate shadows and how the shape of the shadow changes according to which way the light is travelling. Children investigate the following: • How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface? • Why do some people wear glasses to see clearly?
	KEY KNOWLEDGE& SKILLS:	**KEY KNOWLEDGE& SKILLS:**
	• 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 light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
	KEY STICKY KNOWLEDGE	**KEY STICKY KNOWLEDGE**
	• Know that living things can be classified into broad groups based on observable features. • Know what a classification is and be able to create one using appropriate questions. • Know that micro-organisms can be subdivided into bacteria, fungi and viruses.	• Know that light travels in straight lines. • Know that light may come directly from a light source. • Know how shadows are formed and why.
	KEY VOCABULARY	**KEY VOCABULARY**
	Vertebrate fish amphibian reptile bird Mammal invertebrate plants	light source straight lines light ray reflect shadow