

# Our Lady and St Edward's - Intent, Implementation and Impact in Science



## Intent

It is our intent at Our Lady and Saint Edward's to provide children with a Science curriculum that enables them to explore and discover the world around them. We aim to deliver quality teaching and learning opportunities that encourage all children to deepen their knowledge and understanding of the world and to develop the skills associated with Science as a process of enquiry.

## Implementation

We teach the National Curriculum objectives which have been organised into a year group knowledge and skills progression framework. This ensures that, within our scheme of work, skills and knowledge are built on year by year and sequenced appropriately to maximise learning for everybody.

Where applicable, links to Science will be made to develop the children's topical learning.

Children are taught Science for approximately 2 hours per week.

Children use a range of resources in practical investigative work and they are supported with key scientific language lists which they apply to their written work.

Support is determined during each lesson to ensure secure understanding based on the needs of the child.

Challenge is encouraged in lessons and children are asked to communicate and explain their understanding at a deeper secure level.

## Impact

We prepare our children to have the knowledge and scientific vocabulary required to understand and explain the uses and implications of Science in the world today. We strive to promote transferable skills such as enquiry, observation and communication; essential skills our children can use in all aspects of their lifelong learning.

## Our Lady and St Edward's – Science Curriculum Overview

	Autumn	Spring	Summer
<u>Year 1</u>	Ready, Steady, Grow! <i>Plants; Senses</i>	Exploring Materials <i>Everyday materials</i>	Animals and Us <i>Animals, including humans</i>
	Change Outside My Window <i>Seasonal Changes</i>		
<u>Year 2</u>	Staying Healthy <i>Animals, including humans</i>	Habitats Near and Far <i>Living things and their habitat</i>	The Environment Around Us <i>Plants; Uses of everyday materials</i>
<u>Year 3</u>	Move Lightly <i>Light; Animals including Humans</i>	Forces of Nature <i>Forces and Magnets</i>	Under Our Feet <i>Rocks; Plants</i>
<u>Year 4</u>	Waves and Watts <i>Sound; Electricity</i>	Materials and Matter <i>States of matter; Living things and their habitats</i>	The Cycle of Food <i>Animals, including humans</i>
<u>Year 5</u>	Locked, Loaded & Alarmed! <i>Forces</i>	Earth and Beyond <i>Space; Materials (properties of materials)</i>	The Journey of Life <i>Materials (changes to materials); Living things and their habitats</i>
<u>Year 6</u>	The Game of Survival <i>Evolution and Inheritance; Living things and their habitats</i>	Humans <i>Animals, including humans</i>	Flip the Switch! <i>Light; Electricity</i>

# What Science looks like in our Early Years

Learning about life cycles

Learning about melting and freezing through our topic **Our Frosty World**.

Sharing books about the weather, the human body, the world, growing etc

Thinking about the foods that are good for us through our topic **Festivals and Celebrations**

Noticing and talking about the changing seasons

Watching our caterpillars **Growing and Changing** into butterflies.

Recording data such as tally charts, number/pictorial representations

Encouraging awe and wonder about the natural world

Exploring how things work and change and predicting what will happen

Observing how plants grow through our topic **Growing and Changing**.

Talking about our bodies and our unique selves in our topic **Super Me, Super You!**

# Our Lady and St Edward's – National Curriculum Expectations for Science

Year 1 and 2	Year 3 and 4	Year 5 and 6
<p><b>Working Scientifically</b> Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• Asking simple questions and recognising that they can be answered in different ways</li> <li>• Observing closely, using simple equipment</li> <li>• Performing simple tests</li> <li>• Identifying and classifying</li> <li>• Using their observations and ideas to suggest answers to questions</li> <li>• Gathering and recording data to help in answering questions</li> </ul> <p><b>Year 1</b></p> <ul style="list-style-type: none"> <li>• Plants</li> <li>• Animals, including humans</li> <li>• Everyday materials</li> <li>• Seasonal changes</li> </ul> <p><b>Year 2</b></p> <ul style="list-style-type: none"> <li>• Living things and their habitats</li> <li>• Plants</li> <li>• Animals, including humans</li> <li>• Uses of everyday materials</li> </ul>	<p><b>Working Scientifically</b> Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• Asking relevant questions and using different types of scientific enquiries to answer them</li> <li>• Setting up simple practical enquiries, comparative and fair tests</li> <li>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• Identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>• Using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <p><b>Year 3</b></p> <ul style="list-style-type: none"> <li>• Plants</li> <li>• Animals, including humans</li> <li>• Rocks</li> <li>• Light</li> <li>• Forces and magnets</li> </ul> <p><b>Year 4</b></p> <ul style="list-style-type: none"> <li>• Living things and their habitats</li> <li>• Animals, including humans</li> <li>• States of matter</li> <li>• Sound</li> <li>• Electricity</li> </ul>	<p><b>Working Scientifically</b> Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• Using test results to make predictions to set up further comparative and fair tests</li> <li>• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul> <p><b>Year 5</b></p> <ul style="list-style-type: none"> <li>• Living things and their habitats</li> <li>• Animals, including humans</li> <li>• Properties and changes of materials</li> <li>• Earth and space</li> <li>• Forces</li> </ul> <p><b>Year 6</b></p> <ul style="list-style-type: none"> <li>• Living things and their habitats</li> <li>• Animals, including humans</li> <li>• Evolution and inheritance</li> <li>• Light</li> <li>• Electricity</li> </ul>

# Year 1

## Key Knowledge

<b>Ready, Steady, Grow!</b> <i>Plants; Senses</i>	<b>Exploring Materials</b> <i>Everyday materials</i>	<b>Animals and Us</b> <i>Animals including Humans</i>	<b>Change Outside My Window</b> <i>Seasonal changes</i>
Find and name the stem, roots, flower and leaves on flowering plants	All objects are made of one or more material	Name common animals including some fish, birds, mammals, reptiles and amphibians	<b>The Weather changes with the seasons</b>
Find and name the trunk, branches, leaves and roots on deciduous and evergreen trees	Some objects can be made from different materials e.g. a spoon	Animals are different in many ways	<b>In the UK, it is usually colder and rainier in the winter and hotter and drier in the summer</b>
Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring	Materials can be described by their properties e.g. how they look, feel or move	Animals have different body structures e.g. tails, wings, ears	<b>We can use (these) symbols to represent the weather</b>
Recognise and name some common wild and garden plants	Some materials, such as plastic, can have different properties when it is used to make different objects	Animals have different skin coverings e.g. scales, feathers, hair	<b>The change in weather affects things such as: number of minibeasts outside, plant and seed growth, the leaves on the trees, the clothes we wear</b>
		Animals eat different things: <ul style="list-style-type: none"> <li>• Some eat other animals</li> <li>• Some eat plants</li> <li>• Some eat both plants and animals</li> </ul>	<b>The number of hours of daylight changes in each season</b>
			<b>The days feel longer in summer as we have the most hours of daylight</b>
			<b>The days feel shorter in winter as we have the least hours of daylight</b>

Working Scientifically Skills	Asking Questions	Observing and Measuring			Recording and Presenting		Concluding	
	Think of some simple questions to ask	Use simple equipment to help make observations	Talk about what they see, hear, touch, feel and taste	Perform a simple test	Put some information in a simple table or chart	Record their findings using words, pictures, labels and digital recordings	Identify and sort things into groups	Explain in simple terms what they have found out including digital recordings
Ready, Steady, Grow! – Plants; Senses	✓		✓	✓	✓	✓	✓	
Exploring Materials – Everyday materials	✓	✓	✓	✓	✓		✓	✓
Animals and Us – Animals, including humans	✓						✓	✓
Change Outside My Window – Seasonal changes	✓	✓				✓		

Key Skills			
Plants	Animals, including humans	Everyday materials	Seasonal changes
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	Describe the simple physical properties of a variety of everyday materials	<b>Observe changes across the four seasons</b>
Identify and describe the basic structure of a variety of common flowering plants, including trees	Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	Compare and group together a variety of everyday materials on the basis of their simple physical properties	<b>Observe and describe weather associated with the seasons and how day length varies</b>
	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	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	

## Year 2

### Key Knowledge

<b>Staying Healthy</b> <i>Animals, including humans</i>	<b>Habitats Near and Far</b> <i>Living things and their habitat</i>	<b>The Environment Around Us</b>	
		<i>Plants</i>	<i>Uses of everyday materials</i>
Animals, including humans, have offspring that grow into adults	All objects are either living, dead or never been alive	Plants grow at different speeds from seeds or bulbs	All objects are made from one or more materials
In humans and some other animals, the offspring will be young that grow into adults	Living things are plants and animals	Seeds germinate, grow into seedlings then continue to grow into mature plants	
Some animals lay eggs which hatch into young and grow through stages to adults	Dead things include plants & animals plus parts of plants and animals that are no longer attached e.g. leaves, twigs, shells and feathers	Flowers on plants develop into seeds, berries or fruits	Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting
	An object made of wood is classed as dead		
The young of some animals do not look like their parents such as tadpoles and frogs	Objects made from rock, metal & plastic have never been alive		
All animals, including humans, have these basic needs to survive: food to eat, water to drink, air to breathe, shelter	Animals and plants live in a habitat to which they are suited	Seeds/bulbs need to be planted outside at particular times of year	The material an object is made from is chosen because it has suitable properties for the task
	Animals' bodies must have features that allow them to move and find food in their habitat		
To grow into healthy adult animals, including humans, need: good hygiene, exercise, correct types of food, right amounts of foods	Plants' need features / parts that allow them to grow well in their habitat	Some plants are better suited to growing in full sun and some grow better in partial or full shade	
	The habitat provides the basic needs of the plant or animal – shelter, food and water		
	Within a habitat there are microhabitats	Plants also need different amounts of water and space to grow well and stay healthy	
	Which animals and plants live in a microhabitat depends on what it is like there (the conditions) e.g. damp or dry, dark or light		

Working Scientifically Skills	Asking Questions	Observing and Measuring		Recording and Presenting		Concluding		
	Ask simple questions and recognise that they can be answered in different ways	Observe closely and measure using simple equipment	Perform a simple test and explain why it might not be fair to compare two things	Gather and record data in simple tables using ICT to help in answering questions	Identify simple patterns and associations in recorded data	Identify, classify and organise things into groups	Use some scientific words to say what they have seen, including using digital recordings	Use their observations and ideas to suggest answers to questions
Staying Healthy – Animals, including humans	✓	✓		✓	✓		✓	✓
Habitats Near and Far – Living things and their habitats	✓					✓	✓	
The Environment Around Us - Plants	✓	✓	✓	✓			✓	✓
The Environment Around Us – Materials	✓		✓	✓		✓	✓	

Key Skills			
Animals, including humans	Living things and their habitats	Plants	Uses of everyday materials
Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)	Explore and compare the differences between things that are living, dead, and things that have never been alive	Observe and describe how seeds and bulbs grow into mature plants	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	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	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	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		



## Year 3

### Key Knowledge

Move Lightly		Force of Nature <i>Forces and magnets</i>	Under our Feet		
<i>Animals, including humans</i>	<i>Light</i>		<i>Rocks</i>	<i>Plants</i>	
Animals, unlike plants, cannot make their own food	We see objects because our eyes can sense light	A force is a push or a pull	Know that rock is a naturally occurring material	Know that many plants have roots, stems/trunks, leaves and flowers/blossom	
Animals, including humans, need to eat in order to get the nutrients they need	Dark is the absence of light	When an object moves on a surface, the texture of the surface and the object affect how it moves	Know that there are different types of rock which have different properties	Know that the roots absorb water and nutrients from the soil and anchor the plant	
		The texture of the surface may make a movement easier or it may make it harder			
Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed for the body to stay healthy	We cannot see anything in complete darkness	A magnet attracts magnetic material	Know that rocks can be hard or soft	Know that the stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air	
	Some objects are sources of light	The strongest parts of a magnet are the poles	Know that some rocks can be different shapes and sizes (stones, pebbles, boulders)		
A piece of food will often provide a range of nutrients	Some surfaces reflect light	Magnets have two poles; a north pole and a south pole	Know that soils are made up of pieces of ground down rock which may be mixed with plant and animal material	Know that the leaves use sunlight and water to produce the plant’s food (by photosynthesis)	
	Objects are easier to see when there is less light if they are reflective	If two poles the same are brought together they will push away from each other – repel			
Humans, and some other animals, have skeletons and muscles	The light from the sun can damage our eyes	If two different poles are brought together they will pull together - attract	Know that soils are different depending on the type of rock, size of rock pieces and the amount of plant matter in the soil	Pollination – pollen, that has been produced by the male part of the flower, is transferred to the female part of other flowers	
Skeletons and muscles help animals to move and provide protection and support	We should not look directly at the sun and we can protect our eyes by wearing sunglasses or sunhats in bright light	For many forces to act there must be contact			
	Shadows are formed when an opaque or translucent object blocks the path of rays of light.	Some forces such as magnetism can act at a distance	<i>Fossils</i>	Know that some rocks contain fossils	Know that pollination forms seeds which are then dispersed (spread) in different ways
	The size of the shadow depends on the position of the source, object and surface	For many forces to act there must be contact		Know that fossils were formed millions of years ago	Know that different plants require different conditions for germination and growth
				Know how fossilisation occurred: - Plants and animals died, they fell to the seabed - They became covered and squashed by other material - Over time the plant and animal material is dissolved by water in the rock - The dissolved plant and animal material is replaced by minerals in the water	

Working Scientifically Skills	Asking Questions	Planning	Measuring and Presenting			Considering and Evaluating		
	Ask relevant questions and using different types of scientific enquiries to answer them	Set up simple practical enquiries, comparative and fair tests	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Gather, record, classify and present data using ICT in a variety of ways to help in answering questions	Identify differences, similarities or changes related to simple scientific ideas and processes	Use results to draw simple conclusions, make predictions for values, suggest improvements and raise more questions	Report on findings from enquiries, including oral/written explanations, or presentations of results and conclusions
Move Lightly - Animals, including humans	✓	✓		✓	✓			✓
Move Lightly - Light	✓	✓		✓	✓			✓
Force of Nature – Forces and magnets	✓		✓			✓		
Under our Feet – Rocks (and Fossils)	✓	✓		✓			✓	✓
Under our Feet - Plants	✓	✓		✓			✓	✓

Key Skills				
Animals, including humans	Plants	Rocks	Light	Forces and magnets
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	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	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	Recognise that they need light in order to see things and that dark is the absence of light	Compare how things move on different surfaces
			Notice that light is reflected from surfaces	Notice that some forces need contact between two objects, but magnetic forces can act at a distance
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	Describe in simple terms how fossils are formed when things that have lived are trapped within rock	Recognise that shadows are formed when the light from a light source is blocked by a solid object	Describe magnets as having two parts
		Recognise that soils are made from rocks and organic matter	Recognise that light from the sun can be dangerous and that there are ways to protect their eyes	Predict whether two magnets will attract or repel each other, depending on which poles are facing
	Investigate the way in which water is transported within plants		Find patterns in the way that the size of shadows change	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

## Year 4

### Key Knowledge

Waves and Watts		Materials and Matter		The Cycle of Food	
<i>Sound</i>	<i>Electricity</i>	<i>States of matter</i>	<i>Living things and their habitats</i>	<i>Animals, including humans (teeth and digestion)</i>	<i>Animals, including humans (food chains)</i>
A sound produces vibrations which travel through a medium from the source of the sound to our ear	Identify common household appliances that run on electricity – saying which plug into the mains and which run on batteries	A solid keeps its shape and has a fixed volume	Living things can be grouped (classified) in different ways according to their features	Food enters the body through the mouth	Eating food is how animals, including humans, get their energy
		A liquid has a fixed volume but can change its shape to fit a container. It can be poured and keep a level surface		Digestion starts when the teeth start to break the food down	
Mediums such as solids, liquids and gases carry sound <b>but</b> sound cannot travel through a vacuum (an area empty of matter)	Identify and name items required to make an electrical circuit e.g. battery/cell, wires, buzzer, motor, bulb etc.	A gas fills all available space; it has no fixed shape or volume	Classification keys can be used to identify and name living things	Saliva is added and the tongue rolls the food into a ball	A food chain shows how living things get their energy by eating plants or other animals
		Even though they can be poured sugar, salt and sand are all solids; each grain keeps the same shape and volume	Living things live in an environment to which they are suited (Y2)	The food is swallowed and passes down the oesophagus to the stomach, where the food is broken down further	
The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound	A circuit has a battery or cell connected to a component (bulb/motor/ buzzer) using wires	Melting is a change of state from solid to liquid	These environments may change naturally e.g. through flooding, fire, earthquake etc.	The food passes into the small intestine where nutrients are removed from the food and leave the digestive system to be used elsewhere in the body	Some animals will only feed on plants while others will eat other animals
		Freezing is a change of state from liquid to solid. The freezing point of water is at 0°C			
The loudness (volume) of the sound depends on the strength (size) of the vibrations which decreases as they travel through the medium	Know what happens to the component when the circuit is broken	Boiling is a change of state from liquid to gas that happens when a liquid is heated to a certain temperature and bubbles of gas can be seen in the liquid. Water boils when it is heated to 100°C	Humans can also cause the environment to change	The rest of the food then passes into the large intestine, where water is removed for use elsewhere	A food chain is a sequence showing how animals are linked by what they eat
	A switch can be added to a circuit to turn the component (buzzer / bulb / motor) on or off	Water evaporates into the air			
So, sounds decrease in volume as you move away from the source	Some materials allow electricity to pass through them easily – they are known as electrical conductors	The sun heats up water at the surface of seas, rivers, lakes and turns it into water vapour (a gas). The water vapour rises into the air	Some human impact is good (positive) e.g. setting up nature reserves, tree planting, creating a garden pond	What is left is then stored in the rectum until it leaves the body via the anus when you go to the toilet	It shows how energy is transferred within a habitat
		Water vapour condenses into cloud			
A sound insulator is a material which blocks sound effectively	Many metals are electrical conductors	Water vapour in the air cools and changes back into tiny drops of liquid water, forming clouds	Some human impact is bad (negative) e.g. littering, deforestation, plastics in the ocean	Humans have 4 types of teeth: incisors – used for cutting; canines – used for tearing; molars and premolars – used for grinding and chewing food	A food chain starts with plant life and ends with an animal
		Water falls as rain, snow, sleet etc...			
Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.	Water also conducts electricity	When too much water has condensed the water droplets in the clouds get too heavy and water falls back down as rain, snow, sleet etc. This is called precipitation.	These environments also change with the seasons	Living things can be classified (grouped) as producers, predators and prey according to their place in the food chain	
	Some materials do not allow electricity to pass through them – they are known as insulators	Water returns to the sea			
		Rainwater runs over the land and collects in lakes and rivers which take it back to the sea. The cycle starts all over again.	Different living things can be found in a habitat at different times of year		

Working Scientifically Skills	Asking Questions	Planning	Measuring and Presenting			Considering and Evaluating		
	Ask relevant questions and using different types of scientific enquiries to answer them	Set up simple practical enquiries, comparative and fair tests	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Gather, record, classify and present data using ICT in a variety of ways to help in answering questions	Identify differences, similarities or changes related to simple scientific ideas and processes	Use results to draw simple conclusions, make predictions for values, suggest improvements and raise more questions	Report on findings from enquiries, including oral/written explanations, or presentations of results and conclusions
Waves and Watts – Sound								
Waves and Watts - Electricity								
Materials and Matter – States of Matter								
Materials and Matter – Living things and their habitats								
The Cycle of Food – Animals, including humans – teeth & digestion								
The Cycle of Food – Animals, including humans – food chain								

Key Skills				
Electricity	Sound	States of Matter	Living things & their habitats	Animals, inc humans
Identify common appliances that run on electricity	Identify how sounds are made, associating them with something vibrating	Compare and group materials together, according to whether they are solids, liquids or gases	Recognise that living things can be grouped in a variety of ways	Describe the simple functions of the basic parts of the digestive system in humans
Construct a simple series electrical circuit, identifying and naming its basic parts, e.g. cells, wires, bulbs, switches and buzzers	Recognise that vibrations from sounds travel through a medium to the ear	Use knowledge of solids, liquids and gases to decide how mixtures might be separated, e.g. through filtering, sieving and evaporating	Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	Identify the different types of teeth in humans and their simple functions
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	Find patterns between the pitch of a sound and features of the object that produced it	Know that some materials dissolve in liquid to form a solution and describe how to recover a substance from a solution	Recognise that environments can change and that this can sometimes pose dangers to living things	Construct and interpret a variety of food chains, identifying producers, predators and prey
Recognise some common conductors and insulators, and associate metals with being good conductors	Find patterns between a sound's volume and the strength of the vibrations that produced it			
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 that sounds get fainter as the distance from the source increases			

## Year 5

### Key Knowledge

The Laws of Physics	Earth and Beyond		The Journey of Life	
Forces	Earth and Space	Properties and changes of materials	Properties and <b>changes</b> to materials	Living things and their habitats
A force causes an object to start moving, stop moving, speed up, slow down or change direction	The Sun is a star at the centre of our solar system.	Materials have different uses depending on their properties and state	Some changes to materials are reversible e.g. dissolving, mixing and changes of state. However, some changes result in the formation of a new material so the change is non-reversible e.g. burning, rusting and mixing vinegar and bicarbonate of soda	As part of their life cycle plants and animals reproduce
Gravity is a force that acts at a distance	There are 8 planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune	Materials can be grouped together based on their properties e.g. hardness, solubility, transparency, thermal conductivity, electrical conductivity, response to magnets		Most animals reproduce sexually
				Both the male and female are needed for sexually reproduction
Everything is pulled to Earth by gravity and this causes unsupported objects to fall	These (8 planets) all orbit (travel) around the sun.	Some materials will dissolve in a liquid and form a solution		Plants reproduce both sexually and asexually
	The Earth orbits the Sun			
	It takes $365\frac{1}{4}$ days (for the earth) to complete its orbit around the Sun. This is a year.	Others are insoluble and form sediment		
Air resistance, water resistance and friction are contact forces that act between moving objects. The object may be moving over a stationary object	As Earth rotates half faces the Sun (day) and half is fading away from the Sun (night)	Mixtures can be separated by filtering, sieving and exploration		
A mechanism is a device that allows a small force to be increased to a larger force. For this to happen it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance e.g. a crowbar or bottle top remover	As the Earth rotates the Sun <i>appears</i> to move across the sky			
	The Moon orbits the Earth			
	It takes about 28 days to complete its orbit			
Pulleys, levers and gears are all mechanisms, also known as simple machines	The Sun, Earth and Moon are approximately spherical			

Working Scientifically Skills	Asking Questions		Planning	Measuring and Planning		Considering and Evaluating	
	Make a prediction with scientific reasons	Use test results to make predictions to plan further comparative and fair tests	Plan different types of fair scientific enquiries to answer questions, including recognising and controlling variables where necessary	Take measurements, using a range of scientific equipment, with increasing accuracy, taking repeat readings when appropriate	Record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs	Report and present findings from enquiries, through written explanations and conclusions with evidence	Use a graph to identify causal relationships and anomalies
The Laws of Physics – Forces							
Earth and Beyond – Space							
Earth and Beyond – Properties of materials							
The Journey of Life – Changes of materials							
The Journey of Life – Living things and their habitats							

Key Skills				
Living things and their habitats	Animals, including humans	Properties and changes of materials	Earth and space	Forces
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	Describe the changes as humans develop to old age  <i>Objective covered through PSHE</i>	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	Describe the movement of the Earth and other planets relative to the sun in the solar system	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
		Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	Describe the movement of the moon relative to the Earth	
Describe the life process of reproduction in some plants and animals		Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	Describe the sun, Earth and moon as approximately spherical bodies	Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
		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	Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
		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		



## Year 6

### Key Knowledge

The Game of Survival		Humans	Flip the Switch!	
<i>Evolution and inheritance</i>	<i>Living things and their habitats</i>	<i>Animals, including humans</i>	<i>Light</i>	<i>Electricity</i>
Living things have changed over time	Living things can be classified into groups according to observational characteristics that are similar or different	The heart pumps blood in the blood vessels to the lungs	Light travels in straight lines	Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder noise
Fossils give us evidence of what lived on Earth millions of years ago and provide evidence to support the theory of Evolution		In the lungs oxygen goes into the blood and carbon dioxide is removed		
	Plants and animals are two main groups	The blood goes back to the heart	We see objects when light from them goes into our eyes	If you use a battery with a higher voltage, the same thing happens
Plants and animals have characteristics that make them suited (adapted) to their environment	There are living things that do not fit into these two groups e.g. micro-organisms such as bacteria & yeast, and mushrooms and toadstools	It is then pumped around the body	The light may come directly from the light source	Know that: <ul style="list-style-type: none"><li>Adding more bulbs to a circuit will make each bulb less bright</li><li>Using more motors will make each motor spin slower</li><li>Using more buzzers will make each buzzer quieter</li></ul>
If the environment changes rapidly, some variations of a species may not suit the new environment & will die			This means that water, nutrients and oxygen are transported in the blood to the muscles and other parts of the body where they are needed	
	Animals can be divided into two main groups those that have <b>backbones (vertebrates)</b> and those that <b>do not have a backbone (invertebrates)</b>	As all these are used, they produce carbon dioxide and other waste products		
If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics onto their young		Carbon dioxide is carried by the blood in blood vessels back to the heart	Objects that block light will cause shadows	Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow
	Plants can be divided into two main groups; flowering plants and non-flowering plants	The cycle starts again as the carbon dioxide is then transported back to the lungs to be removed from the body	As light travels in a straight line, the shape of the shadow will be the same as the outline of the object	When a circuit is broken, any bulbs, motors or buzzers will turn off too
	Plants can make their own food whereas animals cannot	Diet, exercise, drugs and lifestyle have an impact on the way our bodies function		You can use recognised circuit symbols to draw simple circuit diagrams
Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.		They can affect; how well our hearts and lungs work, how likely we are to suffer from some conditions, how clearly we think and generally how well we feel		
All living things have offspring of the same kind, as features in the offspring are inherited from the parents		Some conditions are caused by deficiencies in our diet e.g. lack of vitamins		
Due to reproduction, the offspring are not identical to their parents, they can vary from each other		Eating a healthy diet involves eating the correct nutrients in the correct amounts		

Working Scientifically Skills	Asking Questions		Planning	Measuring and Planning		Considering and Evaluating	
	Make a prediction with scientific reasons	Use test results to make predictions to plan further comparative and fair tests	Plan different types of fair scientific enquiries to answer questions, including recognising and controlling variables where necessary	Take measurements, using a range of scientific equipment, with increasing accuracy, taking repeat readings when appropriate	Record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs	Report and present findings from enquiries, through written explanations and conclusions with evidence	Use a graph to identify causal relationships and anomalies
The Game of Survival – Evolution and inheritance					✓	✓	✓
The Game of Survival – Living things and their habitats	✓	✓	✓	✓			
Humans – Animals, including humans			✓	✓		✓	
Flip the Switch – Light				✓	✓		✓
Flip the Switch - Electricity	✓					✓	

Key Skills				
Living things and their habitats	Animals, including humans	Evolution and inheritance	Light	Electricity
Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	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 light appears to travel in straight lines	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents	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	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
Give reasons for classifying plants and animals based on specific characteristics	Describe the ways in which nutrients and water are transported within animals, including humans	Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	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 recognised symbols when representing a simple circuit in a diagram
			Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	