

Science Curriculum

Curriculum Intent for Science

Science embodies the acquisition of knowledge and understanding of the natural world and beyond through the process of rigorous testing, observation and experimentation, which constantly challenge and build upon prior discoveries. This process results in technological advancements through the application of Science within engineering, which in turn has a profound impact on the world around us. Consequently, we believe that it is our duty to further develop this Science capital through the study of a diverse range of scientists, noting how these key individuals contributed to their fields.

Our '**Science Curriculum**' challenges us to develop children who understand what Science is, what it is for and its relevance in the world around us. We aim to nurture and develop their inquisitive nature in order to advance their knowledge using scientific vocabulary in order to discuss and confidently question the world around them, as they explore new concepts using a practical, 'hands-on' approach through scientific enquiry. Overall, we strive to expose the children to have a deeper understanding of the world, widening their opportunities for science capital and fostering a life-long love of Science and STEM.

At Red Lane, Science is taught as a discrete subject in order that the development of knowledge, vocabulary and scientific enquiry skills are taught both meaningfully and explicitly. Naturally, links are made to other areas of the curriculum, especially English, Mathematics, Design Technology and Computing, but this does not dilute the quality and entitlement of high quality Science teaching.

The school's long-term plan for Science follows the Key Stage 1 and Key Stage 2 National Curriculum (2014) and sets out the content of teaching within in each year group. This is supported by the school's Science progression document which demonstrates learning outcomes and expectations for Biology, Chemistry, Physics and Working Scientifically within each Science stand and subsequent units of work. Short term planning details how this content is developed over a series of lessons within the unit of work. The organisation of the Science curriculum provides structured opportunities for pupils to:

- Develop and use key scientific vocabulary within their correct contexts.
- Explore concepts and dispel common misconceptions through the use of investigation.
- Explore the world around them, developing their understanding of key physical and biological processes.
- Approach Science through practical scientific enquiry, through the process of enquire, explore, record and explain.

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- Opportunities for working scientifically are provided, using a combination of observation over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and research using secondary sources of information.
- Devise their own lines of enquiry, which can be planned and subsequently implemented.
- Understand the essential role of Mathematics as a quantifiable source of evidence for scientific understanding.
- Understand the role of Science in the wider world, including its cultural impact on our everyday lives.
- Develop their Science capital through their understanding of the work of scientists and naturalists, from a range of times and cultures, understanding how their discoveries contribute to the cumulative nature of scientific understanding. This is covered through year-group unit linked scientists and Red Lane's four House Teams (Marie Curie, Stephen Hawking, Isaac Newton and Katherine Johnson).

Teaching and Learning Science

In addition to the conscious structure and design of the Science curriculum, great consideration has been paid to the design of the implementation of the curriculum in the classroom. Teaching delivery will vary according to the activities being undertaken, but will follow the principles set out in the Teaching, Learning and Implementation policy and will include class, group and individual instruction and guidance, exposition and demonstration, and the use of questioning and discussion. The following resources and approaches are adopted across all year groups in order to ensure effective delivery of the intended curriculum.

The teaching of substantive knowledge and disciplinary knowledge (Working Scientifically) are, where possible, taught in unison, rather than as separate entities, within the majority of Science lessons.

The school's vocabulary progression document (Science) provides a clear focus for the development and exploration of key words, working in conjunction with knowledge organisers, classroom displays of key vocabulary and the use of varied concept and vocabulary exploration activities.

For consistency of approach, the use of adapted Lancashire Planning Posters (physical and electronic) are used to support the teaching of planning practical investigations, guiding pupils to generate focussed scientific enquiry questions.

All year groups undertake a biographical study of a famous scientist linked to specific, identified units of work outlined in the Science long-term plan.

National Curriculum

The national curriculum for science aims to ensure that all pupils:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

End of EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<p>Understanding the World ELG: The natural World</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>The principal focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly - constructed world around them.</p> <p>They should be encouraged to be curious and ask questions about what they notice.</p> <p>They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.</p>	<p>The principal focus of science teaching in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them.</p> <p>They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions.</p> <p>They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair</p>	<p>The principal focus of science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas.</p> <p>They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.</p> <p>At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.</p> <p>They should also begin to recognise that scientific ideas change and develop over time.</p>

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	<p>They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.</p> <p>‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.</p>	<p>tests and finding things out using secondary sources of information.</p> <p>They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.</p> <p>‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.</p>	<p>They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.</p> <p>‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read, spell and pronounce scientific vocabulary correctly.</p>
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Disciplinary Knowledge: Working Scientifically

Working scientifically is a series of processes and skills, which pupils need in order to answer and make sense of scientific questions. They use these skills to answer scientific questions using the most appropriate types of scientific enquiry.

Asking questions

Asking questions that can be answered using a scientific enquiry.



Making predictions

Using prior knowledge to suggest what will happen in an enquiry.



Setting up tests

Deciding on the method and equipment to use to carry out an enquiry.



Observing and measuring

Using senses and measuring equipment to make observations about the enquiry.



Recording data

Using tables, drawings and other means to note observations and measurements.



Interpreting and communicating results

Using information from the data to say what you found out.

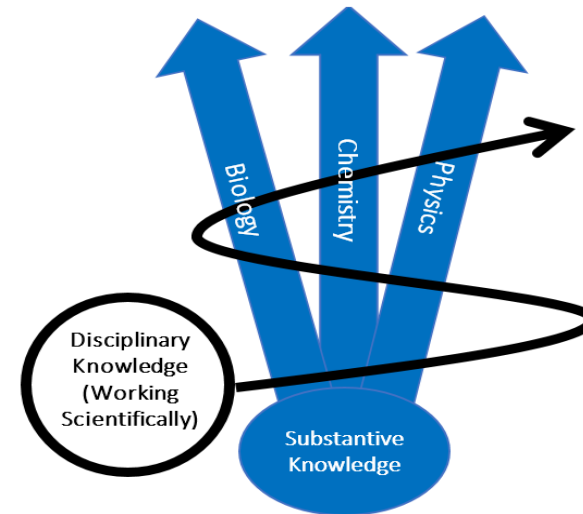


Evaluating

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.



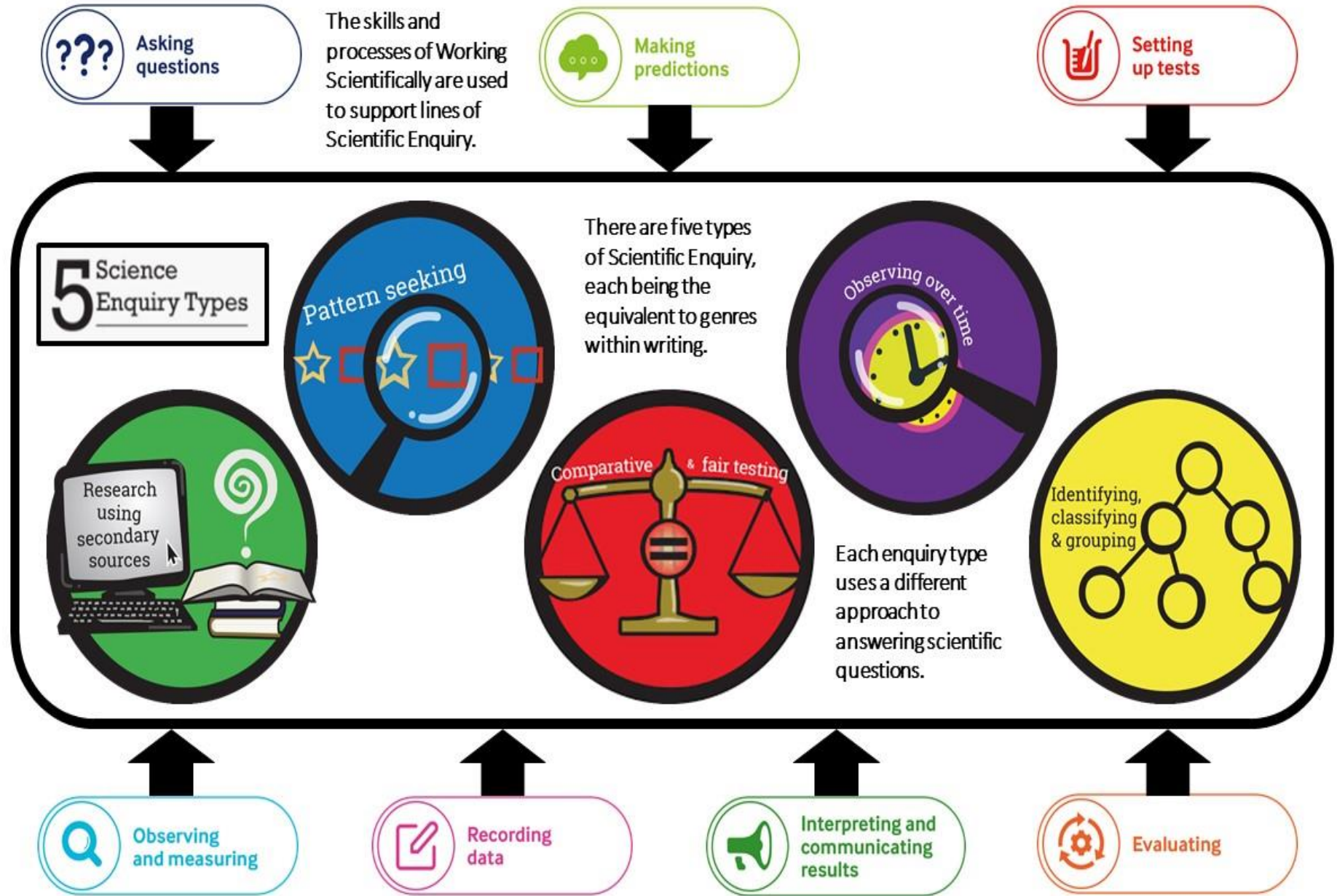
SCIENCE



Working scientifically is integrated throughout the Science curriculum, rather than being separate from it.



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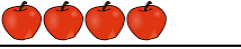



'... Scientific process is infused with maths; maths changes the look of science in a way that one cannot separate it from the other. So if maths is the language of science, then is science the reason for maths?' (Primary Science 124 Sept/Oct 2012)

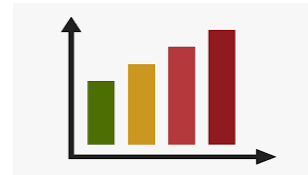
Working scientifically and the scientific process both create discrete and continuous numerical data. Consequently, pupil's understanding and application of Maths skills are vital. Therefore, not only must children be taught how to accurately measure using a variety of units of measurement, they must also be taught to collate this data in a variety of formats, which are best suited to their age and the type of data being collected.

KS1 pupils will more commonly represent data in the form of pictograms and tally charts, which in turn may lead on to form tables and simple bar charts. Within KS2, continuous data sets involving measurements over time will result in the need for line graphs, whilst pattern-seeking lines of enquiry using two variables will require x/y scatter graphs.

Fruit Collected

Banana	
Apple	
Cherry	

Pictogram: Numbers represented by images / pictures.

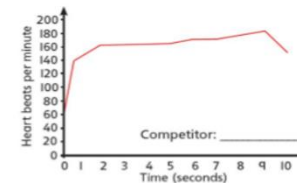


Bar Chart / Graph: Used to compare the numerical values of discrete data sets.

Favorite Pets

Pet	Tally Marks	Number
		10
		4
		6

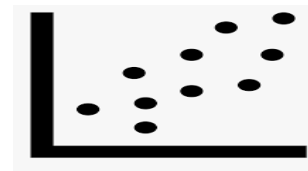
Tally Chart / Frequency Table: A method of recording the number of things seen using tally lines, with totals (frequencies) counted at the end of data collection.



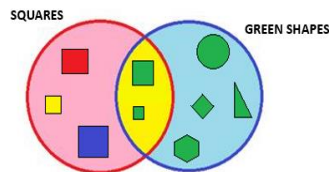
Line Graph: Used to plot continuous data that changes over time or distance.

Water temperature (°C)	Time taken for sugar to dissolve (seconds)
20	55
30	41
40	27

Table: Boxes (rows and columns) where numerical data can be studied.



X / Y Scatter Graph: Use to find patterns and trends using two sets of numerical data in order to plot points.



Venn Diagram: A pictorial method for sorting and separating according to properties (usually non-numerical within Science).



Pie Chart: Similar in function to bar graphs, looking at the frequencies of discrete data sets. These are used to illustrate the proportion of values of the whole.

Overview of Science Content

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Changes All Around - Weather (Taught throughout the year at the appropriate time)		Amazing Animals – Floating and Sinking		Grow With Us – Plants	
	Scientific Enquiry: Observing over Time How much has it rained?		Scientific Enquiry: Will it float or will it sink?			
Reception	Changes All Around – Autumn (Taught throughout the year at the appropriate time)		Amazing Animals – Changing states		Grow With Us – Habitats	
			Scientific Enquiry: How can we get the animals out of the ice?			
Year 1	Physics: Seasonal Changes (Taught throughout the year at the appropriate time)	Chemistry: Everyday Materials		Biology: Animals, Including Humans	Biology: Plants	
	Scientific Enquiry: Observing over Time Pattern Seeking Is the weather the same every day?	Scientific Enquiry: Comparative & Fair Testing Are all materials the same?		Scientific Enquiry: Pattern Seeking Are all animals very different?	Scientific Enquiry: Research using secondary sources What parts is a plant made of?	
	Key Scientist Robert Fitzroy			Biography: Key Scientist Steve Irwin		
	Y1 Seasonal Changes LBQ Assessment	Y1 Everyday Materials LBQ Assessment		Y1 Animals, Including Humans LBQ Assessment	Y1 Plants LBQ Assessment	

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Year 2	Biology: Living Things & their Habitats	Chemistry: Uses of everyday materials	Biology: Animals, Including Humans		Biology: Plants	
	Scientific Enquiry: Identifying, classifying & grouping Is everything on Earth alive?	Scientific Enquiry: Identifying, classifying & grouping Comparative & Fair Testing What materials could be used to make a good raincoat?	Scientific Enquiry: Pattern Seeking Do all animals start off small?		Scientific Enquiry: Observing over Time Do plants grow the same amount every day?	
		Biography: Key Scientist John Boyd Dunlop	Key Scientist Joan Beauchamp Procter			
	Y1 Living Things and Their Habitats LBQ Assessment	Y1 Materials LBQ Assessment	Y1 Animals, Including Humans LBQ Assessment		Y2 Plants LBQ Assessment	
Year 3	Chemistry: Rocks	Physics: Light	Physics: Forces and Magnets	Biology: Animals, Including Humans	Biology: Plants	
	Scientific Enquiry: Identifying, classifying & grouping Are all rocks made in the same way?	Scientific Enquiry: Observing over Time Why do shadows change during the day?	Scientific Enquiry: Identifying, classifying & grouping Are all metals attracted to magnets?	Scientific Enquiry: Research using secondary sources How does our body move and stand up?	Scientific Enquiry: Observing over Time Comparative & Fair Testing Do all plants need exactly the same things?	
	Biography: Key Scientist Mary Anning		Key Scientist Michael Faraday		Key Scientist Beatrix Potter	
	LBQ Vocabulary: 10626	LBQ Vocabulary: 11262	LBQ Vocabulary: 11040	LBQ Vocabulary: 10711 LBQ Vocabulary: 10596	LBQ Vocabulary: 10565 LBQ Vocabulary: 10512	
	10669: Fossil Formation 10927: Rock properties and uses	11262: Light and Dark 11253: Shadows	10894: Forces 11256: Magnets	10560: Different Animal Diets 10605: Skeletons, Muscles and Joints 11498: Food and Diet: Food Groups	11258: What Plants Need to Grow 10500: Life Cycle of a Flowering Plant	

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Year 4	Physics: Electricity	Physics: Sound	Chemistry: States of Matter	Biology: Animals, Including Humans	Biology: Living Things and Their Habitats	
	Scientific Enquiry: Identifying, classifying & grouping Comparative & Fair Testing Does Electricity flow easily through all objects?	Scientific Enquiry: Pattern Seeking How do instruments make different sounds?	Scientific Enquiry: Observing over Time Comparative & Fair Testing Does ice always melt at the same speed?	Scientific Enquiry: Comparative & Fair Testing Research using secondary sources How do different liquids affect our teeth?	Scientific Enquiry: Identifying, classifying & grouping Are some animals more alike than others?	
	Key Scientist Benjamin Franklin				Biography: Key Scientist David Attenborough	
	LBQ Vocabulary: 11034	N/A	LBQ Vocabulary: 10629	LBQ Vocabulary: 10451	LBQ Vocabulary: 10499 LBQ Vocabulary: 10550 LBQ Vocabulary: 10607	
	10893 : Electrical Circuits	11251 : Sound 11272 : Changing the Volume of a Sound 11257 : Changing the Pitch of a Sound	10638 : Processes of Changing State 10642 : Properties of Solids, Liquids and Gases 11250 : The Water Cycle	10452 : The Human Digestive System 10455 : Types and Functions of Teeth	10548 : Parts of a Food Chain 10496 : Classification Keys and Grouping Organisms 10608 : Environmental Changes in Habitats	
Year 5	Physics: Forces	Physics: Earth and Space	Biology: Living Things and Their Habitat	Chemistry: Properties and Changes of Materials	Biology: Animals including humans	
	Scientific Enquiry: Comparative & Fair Testing How do parachutes work?	Scientific Enquiry: Observing over Time Research using secondary sources What shape is the moon and does it change?	Scientific Enquiry: Research using secondary sources If life has existed for billions of years, why are there still people alive today?	Scientific Enquiry: Pattern Seeking Is it possible to separate materials?	Scientific Enquiry: Research using secondary sources Pattern Seeking Does the size of an animal affect its gestation period?	
	Key Scientist Isaac Newton (House Team) Key Scientist: Galileo Galilei	Biography: Key Scientist Galileo Galilei		Key Scientist Marie Curie (House Team)		
	N/A	LBQ Vocabulary: 10653	LBQ Vocabulary: 10577 LBQ Vocabulary: 10492	LBQ Vocabulary: 10888	N/A	
	11255 : Friction 10171 : Gravity and the Difference Between Mass and Weight	10652 : Earth, Sun and Moon 11261 : Our Solar System	10570 : Comparing Life Cycle of Different Animals 11259 : Parts of a Flower	10666 : Irreversible Changes (Levels 1-2 Q1-13)	10575 : Life Cycle of a Human	

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		10654: Relative Movement of the Moon and Earth	10557: Plant Reproduction	10662: Separating Solutions (Levels 1-2 Q1-16) 10698: Dissolving (Q1-19) 10661: Reversible changes (Level 1 Q1-8)		
Year 6	Biology: Animals, Including Humans	Physics: Electricity	Biology: Evolution and Inheritance		Physics: Light	Biology: Living Things and Their Habitats
	Scientific Enquiry: Pattern Seeking Is our heart rate always the same?	Scientific Enquiry: Pattern Seeking Is it possible to change how bright a bulb is?	Scientific Enquiry: Identifying, classifying & grouping Why do species of animals look different?		Scientific Enquiry: Pattern Seeking Why can I hear round corners but not see round corners?	Scientific Enquiry: Observing over Time Comparative & Fair Testing What makes bread rise?
			Biography: Key Scientist Charles Darwin Key Scientist: Jane Goodall			Key Scientist Carl Linnaeus
	LBQ Vocabulary: 10630	LBQ Vocabulary: 10891	LBQ Vocabulary: 10627		LBQ Vocabulary: 11254	LBQ Vocabulary: 10551
	11263: The human circulatory system 11264: The heart and the blood	11045: Cells and Circuits	10648: Evolution		11214: How Light Travels and How We See	10480: Grouping Organisms: Plants, Animals and Microorganisms

SCHEME OF WORK: EYFS - NURSERY

Term:	Nursery – Autumn then throughout the year as seasons change	Key Text(s):	Rosie’s Hat
Unit Title:	<p>Changes All Around – Weather</p> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Know what the weather is. 2. Experience different types of weather e.g. rain/sun/snow. 3. Name different types of weather. <p>The purpose of this unit is for children to begin to explore different types of weather. The children will play outside in all different seasons so that they explore and feel different types of weather. Staff will name and describe different types of weather. Children will be given the opportunity to talk about the weather outside each day. This will be built upon in Reception when children will learn the names of the 4 seasons and look at changes to trees and plants during this time as each season occurs. This is built upon in year 1 when they begin to learn more about the 4 seasons, including the months that fall into each season and the weather patterns they follow. This is then developed further in year 2 as children learn about what plants need to grow well and when plants grow best.</p> <p>End of Unit Outcome: Children have experienced playing outside in different types of weather. They can name different types of weather including rain, sun, snow and wind.</p>		
<u>Prior Knowledge Requirements</u>	<u>Key Vocabulary for the Unit:</u>		
<ul style="list-style-type: none"> • Children may have experienced some weather types already so could talk about these experiences. • Played in snow eg made footprints, snowballs or in puddles • Listened to stories at Christmas time set in winter and stories about a sunny day. • Explored and handled wet and dry materials e.g. ice 	<p>Sun – a star which goes round the earth. Rain – water falling from the sky Wind – movement of air Cloud – evaporated water which floats in the sky Snow – white flakes which fall from the sky (water has frozen as it falls) Hot – a high temperature Cold – a low temperature Weather – what the weather it is like outside Coat – a jacket you wear to keep you warm. Hat - a hat you wear on your head to keep you warm. Scarf – a piece of material you put round your neck to keep you warm. Gloves – two gloves go on your hands to keep you warm.</p>		

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	<p>Wellies – a type of boots used in the rain to keep you dry T-shirt - a thin material you wear in hot weather to keep you cool Shorts – a pair of cropped pants you wear in hot weather to keep you cool</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>There are lots of different types of weather around us and the weather can change every day. The children will be able to identify sunny, rainy, windy and snowy weather.</p>	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the weather. What do they already know? Has anyone been outside before in the rain or snow? 2. Teach new Vocabulary 3. Read a story – Rosie’s Hat. Talk about what happens to Rosie and what caused it. Talk about their experiences of being outside in the wind. 4. Show the children the different types of weather – sunny, rainy, windy and snowy. Talk about the photos of the children in the different types of weather. 5. Teach the children which clothes they will need in different types of weather. 6. Go outside and explore the different weather today. Talk about the weather. What do we need to wear? Why? 7. Outcome – children can talk about the different types of weather as they happen outside. <p><i>Please note – the same structure will be applied during the other seasons but children will be taught at the appropriate time of the year so they can experience the seasons as they happen.</i></p>
<p style="text-align: center;"><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u> Create sensory bottles to represent different types of weather e.g. dark coloured water for rain; cotton wool in bottles for clouds; yellow water and glitter for sunshine; ice for cold; polystyrene balls for snow. Talk about different types of weather. Observe them outside and experience them.</p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources <p>Begin to collect data – take measurements of rainfall over time using a measuring jug. Talk about how it is full or empty.</p>
<p style="text-align: center;"><u>Maths Links:</u></p>	<p>Link to capacity – full and empty language.</p>

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<p><u>Developing a sense of the natural world</u></p> <p>Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p> <p>Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children’s attention to these things as they play.</p> <p>Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example setting up small world trays with ice play in.</p>	<p><u>Books:</u> Rosie’s Hat</p> <p>Links to further study: Reception – Autumn 1 – Changes all around me - Seasons Year 1 – Autumn 1 – Physics: seasonal changes.</p>
<p><u>Direct Links to the EYFS Early Learning Goals</u></p> <p>ELG: The Natural World</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none">• Explore the natural world around them, making observations and drawing pictures of animals and plants.• Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.• Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. <p>ELG: People, Culture and Communities</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none">• Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.	<p><u>Other wider curriculum links to the EYFS Early Learning Goals</u></p> <p>This also links to other areas of learning within the Early Learning Goals including:</p> <p>ELG: Listening, attention and understanding. ELG: Speaking ELG: Comprehension ELG: Past and present</p>

SCHEME OF WORK: EYFS - RECEPTION

Term:	Rec – Autumn then throughout the year as seasons change.	Key Text(s):	The Squirrels Who Squabbled
Unit Title:	<p>Changes All Around - Seasons</p> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Name the 4 seasons 2. Observe changes to plants and trees during each season. <p>The purpose of this unit is for children to begin to learn then names of the 4 seasons and look at changes to trees and plants during this time as each season occurs. Within this unit children will begin to talk about and observe the changes in their environment. This is built upon in year 1 when they begin to learn more about the 4 seasons, including the months that fall into each season and the weather patterns they follow. This is then developed further in year 2 as children learn about what plants need to grow well and when plants grow best.</p> <p>End of Unit Outcome: Children can name the four seasons and talk about environmental changes during each season.</p>		
<u>Prior Knowledge Requirements</u>	<u>Key Vocabulary for the Unit:</u>		
<ul style="list-style-type: none"> • Know what the weather is • Experience different types of weather • Name different types of weather. 	<p>Season: Different times of the year, where weather patterns change along with temperature. The seasons are spring, summer, autumn and winter.</p> <p>Spring: The time of year between March and May. There is usually lots of signs of new growth in Spring.</p> <p>Summer: The hottest season in the UK. It happens between June and August.</p> <p>Autumn: Leaves fall off of trees, the days become shorter and in begins to get colder and wetter.</p> <p>Winter: The coldest season in the UK. Usually have snow in this season. Occurs between December and February.</p> <p>Day: The time where sunlight can be seen.</p> <p>Night: Between sunrise and sunset, where it is dark.</p> <p>Weather: Weather is what the sky and the air outside are like, such as cold and cloudy.</p>		
<u>Composite – The Big Idea</u>	<u>Components – Sequence of Learning</u>		
There are four seasons – Autumn, Winter, Spring and Summer. Each season has different weather and plants and trees change during each season.	<ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the weather. What do they already know? Has anyone been outside before in the rain or snow? 2. Teach new Vocabulary 		

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	<ol style="list-style-type: none"> 3. Read a story – The squirrels who squabbled. Talk about what happens in the story. Talk about the environment. 4. Introduce the season – Autumn. Talk about what autumn is and how plants and trees change during Autumn. 5. Scientific enquiry - Go on an Autumn Walk. Observe the changes to plants and trees during each season. 6. Outcome – children can name the 4 seasons by the end of the year and talk about how the environment changes. <p><i>Please note – the same structure will be applied during the other seasons but children will be taught at the appropriate time of the year so they can experience the seasons as they happen.</i></p>
<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources. <p>How do the seasons change? Take the children on a nature walk around the school grounds. Collect natural resources that they find e.g. leaves, sticks, fir cones. Talk about the evergreen trees that do not lose their leaves. Create nature pictures. Create a STEM journey stick, recording what we saw and found.</p> <p><u>Working Scientifically</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources
<p><u>Maths Links:</u></p>	
<p><u>Developing a sense of the natural world</u> Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p>	<p><u>Books:</u> The Squirrels Who Squabbled</p>

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In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children's interests and their prior knowledge.

Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children's attention to these things as they play.

Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example setting up a shop with fruit and vegetables to talk about harvest.

Links to further study:
Year 1 – Autumn 1 – Physics: seasonal changes.

Direct Links to the EYFS Early Learning Goals

ELG: The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

ELG: People, Culture and Communities

Children at the expected level of development will:

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.

Other wider curriculum links to the EYFS Early Learning Goals

This also links to other areas of learning within the Early Learning Goals including:

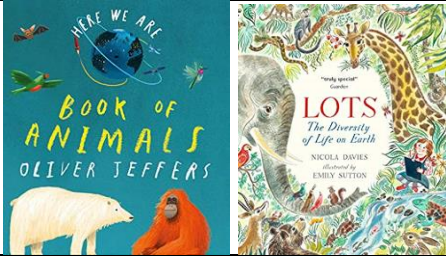
ELG: Listening, attention and understanding.

ELG: Speaking

ELG: Comprehension

ELG: Past and present

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<p>Term:</p> <p>Scientist Study: BIOGRAPHY</p>	<p>Y1 – Spring 2</p> <p>Steve Irwin (1962-2006) Australian television personality, environmentalist and wildlife expert nicknamed 'The Crocodile Hunter.'</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Biology: Animals, Including Humans</p> <p><u>Context for study:</u> This unit is the first of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. From Reception, pupils can name common animals and their babies. Pupils also know that animals that live in particular habitats and know some common features of mini beasts. In Year 1, pupils further develop their knowledge of animals as they are introduced to the concept of 'families' and how animals are grouped according to their shared properties including fish, amphibians, reptiles, birds and mammals. Pupils learn the key features of each animal family and group them into their correct families. New learning includes identifying and naming a variety of common animals that are carnivores, herbivores and omnivores. Pupils identify, name, draw and label the basic parts of the human body. Pupils also learn about the senses. This unit is the precursor to work studied in Year 2 where pupils learn about how animals, and humans, grow and change. Pupils study life cycles of humans and animals such as butterflies, chickens and frogs.</p>		
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • The names of common farm animals and their young • Animals need food, water, shelter and warmth to keep • healthy • How chickens and frogs grow from eggs 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Mammal: Warm-blooded creatures which have fur, breathe air and give birth to live young (no eggs). Fish: A scaly skinned creature with a spine (back bone) which swims under water and breathes using gills. Reptile: Cold-blooded animals which mostly lay eggs and have hard, dry scales covering their body. Most live on land, but some, such as the turtle, live in water. All reptiles breathe air. Bird: Feathered animals which hare warm-blooded and lay eggs. Most, but not all, species of birds can fly. Amphibian: These creatures begin life in water as eggs, have a tadpole-like stage before spending most of their adult life on both land and in water. They have both lungs and gills. Example: Frog Herbivore: Animals which only eat plants. Carnivore: Animals which hunt and eat other animals (meat).</p>		

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			<p>Omnivore: An animal which eats both meat and plants.</p> <p>Nocturnal: Animals which spend most of their lives awake during the night and sleeping during the day.</p> <p>Human: Another word for people. Humans belong to the group of animals called mammals.</p> <p>Pet: An animal which lives with people in their homes.</p> <p>Senses: We use our senses to discover what is around us. There are five senses – sight, hear, smell, taste and touch.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Animals are a type of life which are found almost everywhere in the world. There are many different types, coming in many shapes and sizes. Some are wild, whilst others are domesticated and kept as pets or farmed.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • only four-legged mammals, such as pets, are animals • humans are not animals • insects are not animals • all ‘bugs’ or ‘creepy crawlies’, such as spiders, are part of the insect group • amphibians and reptiles are the same. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Group animals by their body type (Include insects, spiders, worms etc. as well as vertebrates). 3. Place animals in the fish, amphibian, bird, reptile and mammal groups 4. Are all animals very different? 5. Explain what part of the body is to do with which sense 6. Label the main parts of the human body, including those linked to the five senses. 7. Sort animals according to their diets – carnivores, herbivores and omnivores. 8. BIOGRAPHY: Steve Irwin. 9. Information texts and LBQ Question Set 		
<u>Maths Links:</u>			
NC Objectives	Knowledge Content	Working Scientifically	
<p><i>Pupils will be taught to: Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</i></p>	<ul style="list-style-type: none"> • Pupils will know that animals are grouped together in ‘families’ based on shared properties. They will name the groups fish, amphibians, reptiles, birds and mammals. 	<p><u>Scientific Enquiry:</u> Pattern Seeking Are all animals totally different?</p>	

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Identify and name a variety of common animals that are carnivores, herbivores and omnivores

Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)

Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Working scientifically:

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

Identifying and classifying

- Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone.

Mammals	Fish	Bird	Reptile	Amphibian
Mouse	Carp	House Sparrow	Common lizard	Common toad
Fox	Stickleback	Blackbird	Adder	Common frog
Badger	<u>Wider World</u>	Magpie	Grass snake	Smooth newts
Squirrel	Cod	Starling	<u>Wider World</u>	
Hedgehog	Tuna	Robin	Iguana	<u>Wider World</u>
<u>Wider World</u>	Salmon	<u>Wider World</u>	Chameleon	Poison dart frog
Elephant		Flamingo	Crocodile	
Tiger		Penguin	Alligator	
Gorilla		Macaw		
Lion		Pelican		
Orangutan		Emu		

- Know the features of a fish - gills, scales, fins, water dwelling
- Know the features of mammals - hair or fur, babies drink mother's milk, live on land or water
- Know the features of amphibians - live on land or water when adults, soft skin, lay eggs in water, live in water when young
- Know the features of reptiles - dry scaly skin, lay eggs on land
- Know the features of birds - wings, feathers, beak/bill, hatch from eggs, most can fly but some can't (e.g., ostrich, penguin, kiwi)

Parts of the human body

- Know that we have five senses - smell, taste, touch, sight, hearing
- Know and identify (labelling) the following body parts, linking them to the senses.

Using pictures of animals, children find out if they can find anything that is the same for all of the animals, thinking about what they do and how they look. Show smaller and larger versions of each animal.

Sorting animals into the correct classification

Know that objects can be identified or sorted into groups based on their observable properties

Know that we can write down numbers and words or draw pictures to record what we find.

Know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants

Know that a cat is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of

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Sense	Part of the body
sight	eyes
smell	nose
touch	hands, feet, arms, legs etc
hearing	ears
taste	tongue

- Know why we need the following body parts - ears, mouth, eyes, nose, tongue.
- Know that the brain controls the body and is where you think and remember things.
- Know the location of the brain.

Carnivores, herbivores & Omnivores:

- Know that animals must eat and drink in order to survive.
- Understand that some animals only eat meat – carnivores (Identify / sort examples).
- Understand that some animals only eat plants – herbivores (Identify / sort examples).
- Understand that some animals eat both plants and meat – omnivores (Identify/sort examples).
- Introduce the children to basic food chains (Links to Y4 Animals, Including Humans (Digestion)).

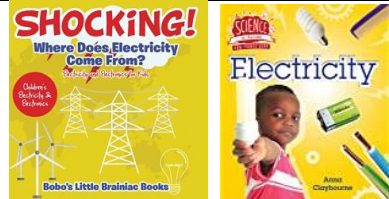
Biography: Steve Irwin

- Australian naturalist and conservationist.
- Born: 1962; Died: 2006 (Stingray barb to the heart).
- Nicknamed: 'The Crocodile Hunter'.
- TV personality and owner of 'Australia Zoo', Queensland.



omnivores (though not vegetarians)

SCHEME OF WORK: YEAR 4

Term:	Y4- Autumn 1	Key Text(s):	
Scientist Study:	N/A		
Unit Title:	Physics: Electricity <u>Context for study:</u> This unit is the first of two science units where pupils learn about electricity as part of the discipline of physics - the study of the processes that shape our world and how we use it. Children will have limited prior knowledge before studying this unit. During this Year 4 unit, pupils identify common appliances that run on electricity and construct a simple series electrical circuit, identifying and naming its basic parts. Pupils investigate 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. Pupils recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. They recognise some common conductors and insulators, and associate metals with being good conductors. The knowledge acquired in this unit will help pupils to compare and group together everyday materials on the basis of their properties, in terms of conductivity, in Year 5. This is the precursor to work studied in Year 6 when pupils use recognised symbols when representing a simple circuit in a diagram. Pupils investigate the brightness of lamps or the volume of buzzers with the number and voltage of cells used in the circuit. Pupils compare and give reasons for variations in how components function.		
<u>Prior Knowledge Requirements</u>	<u>Key Vocabulary for the Unit:</u>		
<ul style="list-style-type: none"> • Through play know which devices use electricity (battery and mains) and that the electricity provides the energy for the device to work. • Know some everyday devices which use electricity 	<p>Electricity: The flow of electrons through conducting materials such as metal.</p> <p>Electrical Appliance: A machine which is powered by electricity.</p> <p>Mains: The electricity source from sockets within homes. This supply is more powerful than batteries and is generated by power stations.</p> <p>Electrical Circuit: A complete loop with no gaps or breaks of electrical components, linked by wires and containing a power source (cell / battery).</p> <p>Cell / Battery: A container that chemically stores electricity. They are used to power portable electrical appliances.</p> <p>Positive / Negative: The two, oppositely charged ends of a cell (battery).</p>		

<ul style="list-style-type: none"> Sources of light and sound may need electricity to work 	<p>Short Circuit: A circuit with a cell / battery with no appliances to power. The wires dangerously overheat and the battery is quickly drained.</p> <p>Crocodile Clip: A metal, toothed clip used to join wires to electrical components.</p> <p>Bulb: An electrical device designed to create light.</p> <p>Switch: A device which allows the controlled breaking and completion of circuits in order to turn things on/off.</p> <p>Buzzer: An electrical device which makes a buzzing sound.</p> <p>Electrical Conductor: Some materials let electricity pass through them easily. These materials (mostly metals) are known as electrical conductors.</p> <p>Electrical Insulator: Some materials stop electricity passing through them.</p> <p>Electrical Symbol: Standardised ways of drawing electrical components.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Electricity is the flow of electrons within materials. As they move, they generate electrical power which can be used to make things work. Electricity flows through closed / complete circuits, using wires to connect a power source to electrical components such as bulbs.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> electricity flows to bulbs, not through them electricity flows out of both ends of a battery electricity works by simply coming out of one end of a battery into the component. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) Explore methods of powering electrical appliances Identify situations when electricity can be dangerous. Create a simple circuit Does Electricity flow easily through all objects? Explain how an electrical switch works. Information Text and LBQ Question Set
<p style="text-align: center;"><u>Maths Links:</u></p>	

NC Objectives	Knowledge Content	Working Scientifically
<p><i>Identify common appliances that run on electricity.</i></p> <p><i>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</i></p> <p><i>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.</i></p> <p><i>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</i></p> <p><i>Working scientifically: Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment,</i></p>	<ul style="list-style-type: none"> • Know appliances that run on electricity in school and at home and those that do not. • Know the difference between mains electricity and battery powered electricity. • Know that electricity is dangerous, and know how to be safe using it. • Identify the hazards that might be faced in the home. <ol style="list-style-type: none"> 1. Overloaded plug extension sockets, 2. Exposed wires, 3. Damaged sockets, 4. Wires left along the carpet for people to trip over, 5. Electrical appliances and wires near water, 6. Placing metal into electrical appliances or open sockets • Know how to prevent these hazards and know not to touch anything they feel is unsafe. • Know how electricity travels through a circuit, and the various components that create a circuit (Battery, cell, open and closed switches, buzzer, lamp, motor, wire and voltmeter.) Note: all batteries are cells, but not all cells are batteries. • A cell is a power source, a battery is a power source that uses chemical reactions to generate power. • Know how to create simple circuits using a battery, a bulb and a switch. • Know that an open switch will not complete the circuit and that a closed switch will complete the circuit. • Know that electricity must be able to flow around the circuit for components to work. • Know that the word current describes the flow of electricity in a circuit. 	<p><u>Scientific Enquiry:</u> Identifying, classifying & grouping Comparative & Fair Testing Does Electricity flow easily through all objects? <i>Children to create a small circuit to test whether objects are conductors or insulators (e.g. circuit with bulb which lights when a gap in the circuit is bridged.)</i></p> <p>Know that conductors allow electricity to pass through them and that insulators prevent the passage of electricity.</p> <p>Know that metals such as copper, iron and steel make good conductors. Know that wood, plastic, paper and rubber are insulators.</p> <p>Identify materials that are conductors and insulators. (Children should know which materials are insulators and conductors prior to the investigation.</p>

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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.

- Know if the following circuits work or not.
- A complete circuit without switches.
- A circuit with wires not connected to the cell on one side.
- A complete circuit with an open switch.
- 4. A complete circuit with a closed switch.

Plan an investigation to check the conductive properties of materials, with pupils predicting that metals will allow a circuit to be complete, but that other materials will not.

Test the predictions and record in a table.

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WORKING SCIENTIFICALLY

Scientific Enquiry

Investigation Ideas

(Years 1-6)

Investigative questions outlined in documentation from the [Ogden Trust](#)



Fair Tests:

Year 3

BIOLOGY: PLANTS

How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh?

CHEMISTRY: ROCKS

How does adding different amounts of sand to soil affect how quickly water drains through it?

PHYSICS: LIGHT

How does the number of layers of transparent plastic affect how much light can pass through?

PHYSICS: FORCES & MAGNETS

How does the mass of an object affect how much force is needed to make it move?

PHYSICS: LIGHT

How does the distance between the shadow puppet and the screen affect the size of the shadow?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

Does the amount of light affect how many woodlice move around?

CHEMISTRY: CHANGING STATES OF MATTER

How does the mass of a block of ice affect how long it takes to melt?

CHEMISTRY: CHANGING STATES OF MATTER

How does the surface area of a container of water affect how long it takes to evaporate?

PHYSICS: SOUND

How does the volume of a drum change as you move further away from it?

PHYSICS: ELECTRICITY

How does the thickness of a conducting material affect how bright the lamp is?

PHYSICS: SOUND

How does the length of a guitar string/tuning fork affect the pitch of the sound?

Year 5

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does the level of salt affect how quickly brine shrimp hatch?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does age affect a human's reaction time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does the temperature of tea affect how long it takes for a sugar cube to dissolve?

PHYSICS: FORCES

How does the angle of launch affect how far a paper rocket will go?

PHYSICS: FORCES

How does the surface area of a container affect the time it takes to sink?

PHYSICS: FORCES

How does the surface area of a parachute affect the time it takes to fall to the ground?

Year 6

BIOLOGY: CLASSIFICATION

How does the temperature affect how much gas is produced by yeast?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the length of time we exercise for affect our heart rate?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Can exercising regularly affect your lung capacity?

PHYSICS: LIGHT

How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?

PHYSICS: ELECTRICITY

How does the voltage of the batteries in a circuit affect the brightness of the lamp?

PHYSICS: ELECTRICITY

How does the voltage of the batteries in a circuit affect the volume of the buzzer?



Comparative Tests:

Year 1

BIOLOGY: PLANTS

Which type of compost grows the tallest sunflower?

BIOLOGY: PLANTS

Which tree has the biggest leaves?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Is our sense of smell better when we can't see?

PHYSICS: SEASONAL CHANGES

In which season does it rain the most?

CHEMISTRY: EVERYDAY MATERIALS

Which materials are the most flexible?

CHEMISTRY: EVERYDAY MATERIALS

Which materials are the most absorbent?

Year 2

BIOLOGY: PLANTS

Do cress seeds grow quicker inside or outside?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do amphibians have more in common with reptiles or fish?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do bananas make us run faster?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Is there the same level of light in the evergreen wood compared with the deciduous wood?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which shapes make the strongest paper bridge?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which material would be best for the roof of the little pig's house?

Year 3

BIOLOGY: PLANTS

Which conditions help seeds germinate faster?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the skull circumference of a girl compare with that of a boy?

CHEMISTRY: ROCKS

Which soil absorbs the most water?

PHYSICS: LIGHT

Which pair of sunglasses will be best at protecting our eyes?

PHYSICS: FORCES & MAGNETS

Which magnet is strongest?

PHYSICS: FORCES & MAGNETS

Which surface is best to stop you slipping?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the average temperature of the pond water change in each season?

BIOLOGY: ANIMALS, INCLUDING HUMANS

In our class, are omnivores taller than vegetarians?

CHEMISTRY: CHANGING STATES OF MATTER

Does seawater evaporate quicker than fresh water?

PHYSICS: SOUND

Which material is best to use for muffling sound in ear defenders?

PHYSICS: SOUND

Are two ears better than one?

PHYSICS: ELECTRICITY

Which metal is the best conductor of electricity?

Year 5

PHYSICS: FORCES

Which seed shape takes the longest time to fall?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Who grows the fastest, girls or boys?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

Which type of sugar dissolves the fastest?

PHYSICS: EARTH & SPACE

How does the length of daylight hours change in each season?

PHYSICS: FORCES

Which shoe is the most slippy?

PHYSICS: FORCES

Which shape parachute takes the longest to fall?

Year 6

BIOLOGY: CLASSIFICATION

Which is the most common invertebrate on our school playing field?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which type of exercise has the greatest effect on our heart rate?

BIOLOGY: EVOLUTION & INHERITANCE

What is the most common eye colour in our class?

PHYSICS: LIGHT

Which material is most reflective?

PHYSICS: ELECTRICITY

Which make of battery lasts the longest?

PHYSICS: ELECTRICITY

Which type of fruit makes the best fruity battery?



Observations Over Time:

Year 1

BIOLOGY: PLANTS

How does a daffodil bulb change over the year?

BIOLOGY: PLANTS

How does my sunflower change each week?

PHYSICS: SEASONAL CHANGE

How does the oak tree change over the year?

BIOLOGY: AMIALS, INCLUDING HUMANS

How does my height change over the year?

CHEMISTRY: EVERYDAY MATERIALS

What happens to materials over time if we bury them in the ground?

CHEMISTRY: EVERYDAY MATERIALS

What happens to shaving foam over time?

PHYSICS: SEASONAL CHANGE

How does the colour of a UV bead change over the day?

Year 2

BIOLOGY: PLANTS

What happens to my bean after I have planted it?

BIOLOGY: AMIALS, INCLUDING HUMANS

How does a tadpole change over time?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the school pond change over the year?

BIOLOGY: AMIALS, INCLUDING HUMANS

How much food and drink do I have over a week?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How long do bubble bath bubbles last for?

CHEMISTRY: USES OF EVERYDAY MATERIALS

What will happen to our snowman?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Would a paper boat float forever?

Year 3

BIOLOGY: PLANTS

What happens to celery when it is left in a glass of coloured water?

BIOLOGY: PLANTS

How do flowers in a vase change over time?

CHEMISTRY: ROCKS

How does tumbling change a rock over time?

CHEMISTRY: ROCKS

What happens when water keeps dripping on a sandcastle?

PHYSICS: FORCES & MAGNETS

If we magnetise a pin, how long does it stay magnetised for?

PHYSICS: LIGHT

When is our classroom darkest?

PHYSICS: LIGHT

Is the Sun the same brightness all day?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the variety of invertebrates on the school field change over the year?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does an egg shell change when it is left in cola?

CHEMISTRY: CHANGING STATES OF MATTER

Which material is best for keeping our hot chocolate warm?

CHEMISTRY: CHANGING STATES OF MATTER

How does the level of water in a glass change when left on the windowsill?

CHEMISTRY: CHANGING STATES OF MATTER

How does the mass of an ice cube change over time?

PHYSICS: ELECTRICITY

How long does a battery light a torch for?

PHYSICS: SOUND

When is our classroom the quietest?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

How do brine shrimp change over their lifetime?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does a bean change as it germinates?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does our compost heap change over time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a container of salt water change over time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a sugar cube change as it is put in a glass of water?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a nail in salt water change over time?

PHYSICS: FORCES

How long does a pendulum swing for before it stops?

Year 6

BIOLOGY: CLASSIFICATION

What happens to a piece of bread if you leave it on the windowsill for two weeks?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does my heart rate change over the day?

BIOLOGY: EVOLUTION & INHERITANCE

How do different animal embryos change?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How much exercise do I do in a week?

PHYSICS: ELECTRICITY

Does the temperature of a light bulb go up the longer it is on?

PHYSICS: ELECTRICITY

How would you group electrical components and appliances based on what electricity makes them do?

PHYSICS: LIGHT

How does my shadow change over the day?



Pattern Seeking:

Year 1

PHYSICS: SEASONAL CHANGES

Do trees with bigger leaves lose their leaves first in autumn?

BIOLOGY: PLANTS

Is there a pattern in where we find moss growing in the school grounds?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do you get better at smelling as you get older?

PHYSICS: SEASONAL CHANGES

Does the wind always blow the same way?

CHEMISTRY: EVERYDAY MATERIALS

Is there a pattern in the types of materials that are used to make objects in a school?

Year 2

BIOLOGY: PLANTS

Do bigger seeds grow into bigger plants?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What conditions do woodlice prefer to live in?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which age group of children wash their hands the most in a day?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Which habitat do worms prefer – where can we find the most worms?

PHYSICS: FORCES & MAGNETS

Do magnetic materials always conduct electricity?

Year 3

BIOLOGY: PLANTS

What colour flowers do pollinating insects prefer?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do male humans have larger skulls than female humans?

CHEMISTRY: ROCKS

Is there a pattern in where we find volcanoes on planet Earth?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are you more likely to have bad eye sight and to wear glasses if you are older?

PHYSICS: FORCES & MAGNETS

Does the size and shape of a magnet affect how strong it is?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How has the use of insecticides affected bee population?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are foods that are high in energy always high in sugar?

CHEMISTRY: CHANGES IN STATES OF MATTER

Is there a pattern in how long it takes different sized ice lollies to melt?

PHYSICS: SOUND

Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?

PHYSICS: ELECTRICITY

Which room has the most electrical sockets in a house?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

Is there a relationship between a mammal's size and its gestation period?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are the oldest children in our school the tallest?

PHYSICS: FORCES

Do all stretchy materials stretch in the same way?

PHYSICS: EARTH & SPACE

Is there a pattern between the size of a planet and the time it takes to travel around the Sun?

PHYSICS: FORCES

Do all objects fall through water in the same way?

Year 6

BIOLOGY: CLASSIFICATION

Do all flowers have the same number of petals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Is there a pattern between what we eat for breakfast and how fast we can run?

BIOLOGY: EVOLUTION & INHERITANCE

Is there a pattern between the size and shape of a bird's beak and the food it will eat?

PHYSICS: LIGHT

Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom?

PHYSICS: ELECTRICITY

Does the temperature of a light bulb go up the longer it is on?



Research:

Year 1

BIOLOGY: PLANTS

What are the most common British plants and where can we find them?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How are the animals in Australia different to the ones that we find in Britain?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do all animals have the same senses as humans?

PHYSICS: SEASONAL CHANGES

Are there plants that are in flower in every season? What are they?

CHEMISTRY: EVERYDAY MATERIALS

How are bricks made?

CHEMISTRY: EVERYDAY MATERIALS HUMANS

Which materials can be recycled?

Year 2

BIOLOGY: PLANTS

How does a cactus survive in a desert with no water?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What do you need to do to look after a pet dog/cat/lizard and keep it healthy?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What food do you need in a healthy diet and why?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the habitat of the Arctic compare with the habitat of the rainforest?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How have the materials we use changed over time?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How are plastics made?

Year 3

BIOLOGY: PLANTS

What are all the different ways that seeds disperse?

CHEMISTRY: ANIMALS, INCLUDING HUMANS

Why do different types of vitamins keep us healthy and which foods can we find them in?

CHEMISTRY: ROCKS

Who was Mary Anning and what did she discover?

PHYSICS: LIGHT

How does the Sun make light?

PHYSICS: FORCES & MAGNETS

How have our ideas about forces changed over time?

PHYSICS: FORCES & MAGNETS

How does a compass work?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

Why are people cutting down the rainforests and what effect does that have?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How do dentists fix broken teeth?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are hurricanes, and why do they happen?

PHYSICS: ELECTRICITY

How has electricity changed the way we live?

PHYSICS: ELECTRICITY

How does a light bulb work?

PHYSICS: SOUND

Do all animals have the same hearing range?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are the differences between the life cycle of an insect and a mammal?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Why do people get grey/white hair when they get older?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are microplastics and why are they harming the planet?

PHYSICS: EARTH & SPACE

How have our ideas about the solar system changed over time?

PHYSICS: EARTH & SPACE

What unusual objects did Jocelyn Bell Burnell discover?

PHYSICS: FORCES

How do submarines sink if they are full of air?

Year 6

BIOLOGY: CLASSIFICATION

What do different types of microorganisms do? Are they always harmful?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How have our ideas about disease and medicine changed over time?

BIOLOGY: EVOLUTION & INHERITANCE

What happened when Charles Darwin visited the Galapagos islands?

BIOLOGY: EVOLUTION & INHERITANCE

Why do some people need to wear glasses to see clearly?

PHYSICS: ELECTRICITY

How has our understanding of electricity changed over time?

PHYSICS: LIGHT

How do astronomers know what stars are made of?



Identifying and Classifying:

Year 1

BIOLOGY: PLANTS

How can we sort the leaves that we collected on our walk?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we organise all the zoo animals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What are the names for all the parts of our bodies?

PHYSICS: SEASONAL CHANGES

How would you group these things based on which season you are most likely to see them in?

CHEMISTRY: EVERYDAY MATERIALS

We need to choose a material to make an umbrella. Which materials are waterproof?

CHEMISTRY: EVERYDAY MATERIALS

Which materials will float and which will sink?

Year 2

BIOLOGY: PLANTS

How can we identify the trees that we observed on our tree hunt?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which offspring belongs to which animal?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How would you group these plants and animals based on what habitat you would find them in?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How would you group things to show which are living, dead, or have never been alive?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which materials are shiny and which are dull?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which materials will let electricity go through them, and which will not?

Year 3

BIOLOGY: PLANTS

How many different ways can you group our seed collection?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How do the skeletons of different animals compare?

CHEMISTRY: ROCKS

Can you use the identification key to find out the name of each of the rocks in your collection?

PHYSICS: LIGHT

How would you organise these light sources into natural and artificial sources?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we group the food that we eat?

PHYSICS: FORCES & MAGNETS

Which materials are magnetic?

Year 4

BIOLOGY: ANIMALS, INCLUDING HUMANS

What are the names for all the organs involved in the digestive system?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we organise teeth into groups?

CHEMISTRY: CHANGING STATES OF MATTER

Can you group these materials and objects into solids, liquids, and gases?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Can we use the classification keys to identify all the animals that we caught pond dipping?

PHYSICS: ELECTRICITY

How would you group these electrical devices based on where the electricity comes from?

CHEMISTRY: CHANGING STATES OF MATTER

How would you sort these objects/materials based on their temperature?

Year 5

BIOLOGY: ANIMALS, INCLUDING HUMANS

Can you identify all the stages in the human life cycle?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Compare this collection of animals based on similarities and differences in their lifecycle.

CHEMISTRY: PROPERTIES AND CHANGES OF MATERIALS

Can you group these materials based on whether they are transparent or not?

PHYSICS: EARTH & SPACE

How could you organise all the objects in the solar system into groups?

PHYSICS: FORCES

Can you label and name all the forces acting on the objects in each of these situations?

PHYSICS: EARTH & SPACE

Can you observe and identify all the phases in the cycle of the Moon?

Year 6

BIOLOGY: CLASSIFICATION

How would you make a classification key for vertebrates/invertebrates or microorganisms?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which organs of the body make up the circulation system, and where are they found?

BIOLOGY: EVOLUTION & INHERITANCE

Compare the skeletons of apes, humans, and Neanderthals – how are they similar, and how are they different?

BIOLOGY: EVOLUTION & INHERITANCE

Can you classify these observations into evidence for the idea of evolution, and evidence against?

PHYSICS: LIGHT

Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?

PHYSICS: ELECTRICITY

How would you group electrical components and appliances based on what electricity makes them do?