



# SCIENCE POLICY

## INTENT

At Wickersley Partnership Trust (primary) we aim to ensure our Science curriculum is designed to sequence learning and embed the key skills that are required to develop curious students into competent designers, engineers, architects and chefs.

We believe that our Science curriculum prepares children for the rapidly changing world that we live in, empowering the children in all areas of the subject so that they may aspire to a science based career choice. Our Science curriculum encourages pupils to look at the world around them, and begin to find answers to questions. Through practical enquiry and class work, we look to provide all pupils with a solid understanding of basic scientific principles, which will enthuse them to want to study Science further.

We cover all 3 aspects of Science; Biology, Chemistry and Physics.

It is vital that curriculum knowledge and skills are not learnt in isolation. We teach Science through the progression of skills and knowledge, both of which are planned in a sequential document and include in this, key lines of inquiry to develop links across the curriculum as well as to the bigger concepts that drive our curriculum intent, such as democracy and equality.

### AIMS

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.

### SCIENTIFIC KNOWLEDGE AND CONCEPTUAL UNDERSTANDING

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

### THE NATURE, PROCESSES AND METHODS OF SCIENCE

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

## HOW WE INTEND TO REMOVE BARRIERS

In Science, we remove barriers to learning and support students' ability to access the curriculum through the development of literacy, numeracy, oracy skills and vocabulary acquisition.

Misconceptions do not go unchallenged and the supportive environment within each lesson ensures that students develop their own literacy and vocabulary.

### LITERACY

Students are given many opportunities to read widely and often with students directed to texts related to Science and scientists, as well as researching independently. Pupils take part in learning opportunities with a range of contexts for reading and writing. These will develop from being supported to independent.

### NUMERACY

Throughout each year of the curriculum data handling skills are sequenced to become more complex over time. This ensures students build on the fundamental aspects of each one and develop their confidence and understanding.

### ORACY

In order to develop their oracy within a subject specific context pupils are given opportunities to talk about their learning. Staff challenge use of scientific language and will direct pupils towards the correct terminology when appropriate.

### VOCABULARY

Students are introduced to key subject specific vocabulary and have regular opportunities to reinforce their understanding. Key Science vocabulary is highlighted to the pupils and pupils are guided to use this in their work.

## HOW WE DEVELOP SKILLS FOR LEARNING

Students are given opportunities to develop their skills for learning in each lesson. Engaging starter activities help students to recall the key concepts of prior learning. Our aspiring scientists are presented with a variety of experiences and learning opportunities. They are challenged to think critically and form opinions.

The skills for learning process within the Science curriculum both reinforces the key design skills content and helps our students to know, remember and be able to do more at each stage of the curriculum.

Teacher assessment informs planning and progression within the curriculum.

## HOW WE FOSTER PERSONAL ATTRIBUTES

In Science our curriculum intent embodies that of the school. We are committed to ensuring students are exposed to the wider world context in order to develop them as well rounded individuals. Our curriculum demands independence, resilience and responsibility in line with SCHOOL Way.

Science is an inspiring, rigorous and practical subject. Pupils learn how to take risks, becoming resourceful, innovative and capable citizens. Through the evaluation of past and present scientific ideas, they develop a critical understanding of its impact on daily life and the wider world.

## HOW WE INTEND TO ENRICH STUDENT EXPERIENCES AND BROADEN THE HORIZONS OF STUDENTS

Science is a curriculum that is rooted in the wider world of work. To this end we broaden the horizons of all our students and enrich their learning through a range of first hand experiences. All our students have exposure to learning beyond the traditional mainstream lesson and have opportunities to enrich their experiences. As a trust, we have developed links with the Advanced Manufacturing Park in order to enable pupils to see a real world context for the subject. Primary schools are developing links with the subject specialist departments in the secondary schools in order to enhance opportunities and inspire pupils to see how the study of Science can lead to future roles in society. Science is planned as part of cross curricular topics to support links in learning.

**SUBJECT INTENT:** It is vital that curriculum knowledge and skills are not learnt in isolation. We teach science through the progression of skills and knowledge, both of which are planned in a sequential document and include in this, key lines of enquiry to develop links across the curriculum as well as to the bigger concepts that drive our curriculum intent, such as democracy and equality. Exemplification of these skills can be found in the appendix document.

		TOPICS	EARTH AND SPACE		
SCIENCE UNIT			Habitats and Environment	Planets and the Solar System	Forces
EYFS	Knowledge	<p><b>WHERE DO I LIVE?</b> This topic covers what we know about where we live and helps us to find out that there are different places in our world.</p> <p><b>SUGGESTED TEXTS</b> Sally and the Limpet, Sharing a Shell, This is Our Home, Bringing Down the Moon, How to catch a star, Shine Moon Shine.</p> <p><b>SUGGESTED VISITS</b> The Deep, Seaside.</p>	<p>Where do I live? What do I like about my home? What is different between my home and school? What is different between my home and the seaside? What creatures live in Rock pools? Could they survive here?</p> <p>I can tell you where I live. I can talk about my house. I know that the seaside is a journey away to the coast. I know that sea creatures could not live in my garden because they need special salt water etc.</p>	<p>Where do I live? What can I see in the sky from where I live? What is the sun made out of? Is it safe to look at the sun? Is it safe to look at the moon? What is our planet called?</p> <p>I know that my home town is .... I can name the sun and the moon. I know that I must never look directly at the sun. I can name our planet Earth.</p>	Links with Physical World.
	Skills		<p>ELG The Natural World</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>ELG Comprehension. Use new vocabulary.</p> <p>ELG Listening - Listen attentively and respond to what they hear with relevant questions they have heard.</p>	
	Practicals, Experiments and writing links		<p>Ask children to bring in photographs of any places they have visited such as the seaside - talk about what the place looked like and how it differs to home.</p> <p>Observe sea creatures such as a crab - what does it need to stay alive? What is special about the sea? Can we drink sea water?</p>	<p>Read Bringing Down the Moon - could we build a ladder to the moon? How do people travel to the moon? Build models of rockets.</p> <p>Read Shine Moon Shine - do people live on the moon? Do animals live on the moon? Watch video clips of the moon landings and talk about the special suits astronauts need to survive in space.</p>	<p>Sing Head, Shoulders, Knees and Toes and other body part songs (My Bodyworks: Songs about Your Bones, Muscles, Heart and More! By Jane Schoenberg and Steven Schoenberg).</p> <p>In outdoor learning and PE feel the effect of exercise by putting hands on chest etc.</p>
YEAR 1	Knowledge	<p><b>WHERE DO I LIVE?</b> This topic is all about where we live. It looks at the basic needs to survive and compares the Earth, Sun and moon. It considers how where we live affects us.</p> <p><b>SUGGESTED TEXTS</b> Whatever Next, How to catch a star, man in the Moon, The way back home, Beegu, Space tortoise.</p>	<p>Do plants need sunlight to grow? Can animals and plants live on the moon?</p> <p>I know that plants need sunlight to grow. <b>I can observe changes across the four seasons. I can observe and describe the weather associated with the seasons and how day length varies</b> as the season changes eg longer daylight in the summer months.</p>	<p>What shape is the Sun, Moon and Earth? What is the Earth made of? Why do we need to wear sunglasses when it is sunny? What happens to the sun when it is cloudy? Which is the biggest, the Sun, Moon or Earth?</p> <p>I can recognise the Sun, Moon and Earth. I know the Earth has land water and air and the moon does not have air or water. I know that the Earth and moon is made of rock. I know that the Sun is a source of light even when it is behind a cloud. I can order the size of the Sun, Moon and Earth.</p>	<p>How can we move objects?</p> <p>I know that humans move objects with a push or a pull.</p>
	Did you know?		I know that animals and plants do not live on the Moon because there is no air and water.		I know that there are many sorts of movement which can be described in many ways and that movement can be stopped.
	Skills		<p>Talk about what they have done and say, with help, what they think they have found out.</p> <p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.</p>	<p>Ask simple scientific questions.</p> <p>With support, gather and record simple data in a range of ways.</p>	<p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features. With support, follow instructions to perform simple tests and begin to talk about what they might do or what might happen.</p> <p>With support, use simple equipment to measure and make observations.</p>
	Practicals, Experiments and writing links		Writing their own questions about the seasons/plants. Growing seeds in the light/dark. Observe how do the leaves change on trees in the different seasons. Observe how blossom forms on the trees in spring and develop into fruit over the summer for harvesting late summer/autumn.	<p>Writing own questions for enquiry discussion. Comparing scaled pictures of the sun, moon and the Earth, discussing what is the same and different.</p> <p>Go outside in different weathers - feel the effect of the wind on a windy day - discuss if they were on the Moon it would not feel like this. On a cloudy day even though they cannot see the sun it still produces light from behind the cloud. On a calm day you cannot feel the wind.</p>	<p>Practical - investigating objects that you can push/pull Investigate how to start and stop the motion of an object - wheeled toy, throwing and catching a ball, balloon passing, balloon tennis/ volleyball.</p>



		TOPICS	EARTH AND SPACE		
SCIENCE UNIT			Habitats and Environment	Planets and the Solar System	Forces
YEAR 2	Year 2 Knowledge	<p><b>SOLAR SYSTEM</b> Where is Planet Earth? This topic is all about the solar system and how it is interlinked. During this topic, we should compare how plants, animals and humans can survive on Earth but not on different planets and why this is. Within the topic, we can begin to look at forces that act on the Earth. We also look at the effects of the sun.</p> <p><b>SUGGESTED TEXT</b> Tower to the Sun. Here we are - Oliver Jeffers - really good for this. Egg Drop.</p>	<p>What are the main habitats on Earth and what animals live in each habitat? What is the best habitat for and why? Why can't animals live on other planets? What is the weather like in. ? Can you name the months and seasons? What do plants need to grow? Would plants be able to grow on any other planet?</p> <p><b>I can 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.</b></p>	<p>Can you name some planets in our solar system? Are planets all the same size? What happens to the sun throughout the day? Is a cloudy day the same as night-time? What can you make a shadow with?</p> <p>I know that there are different planets in our solar system and name some. I know the Sun appears to move during the day. I can say changes that occur when the Sun goes behind a cloud and recognise that these are different from changes at nightfall. I know how my body/or object can make a shadow.</p>	<p>What makes something move? What makes things fall to the ground?</p> <p>I know that it is not only ourselves that make things move by pushing or pulling. I know that a force called gravity causes things to fall on Earth.</p>
	Did you know?		I know animals don't live on other planets as they need air, water and food to stay alive.	I know that the planets in the solar system are different sizes and are made out of different things.	I can ask questions about what is causing movement.
	Skills		<p>Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.</p> <p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.</p>	<p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explain their reasoning.</p> <p>Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language. Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.</p> <p>Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.</p>	<p>Ask and answer scientific questions about the world around them.</p> <p>Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.</p> <p>Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.</p>
Practicals, Experiments and writing links		<p>Information booklet on the Earth/seasons/weather. Observation over time of seasons/months and changes and how that is linked to temperature and light level. Observe puddles in different seasons - freezing/ evaporation based on temperature.</p> <p>Construct a daily weather chart, identifying date, season and weather. Use to discuss and compare patterns in weather at different times of the year.</p>	<p>Practical - investigating matching the shadows to the object. Using more than one shadow - could this shadow be made from this object?</p> <p>Observe the movement on the sun throughout the day in class and outside.</p> <p>Look at sunrise and sunset pictures/film clips - speeding up. Use a range of secondary resources to research similarities and differences - between the Earth, moon and sun.</p>	<p>Observing change when play dough drops onto a hard surface. Investigate how other objects are affected by gravity as they fall. (Link to properties of materials).</p> <p>Use foot pump rockets to launch and observe the upwards movement of the rocket and discuss why it has moved.</p> <p>Use a range of secondary resources to research similarities and differences between types of movement and how things move.</p>	

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YEAR 3	Year 3 Knowledge	<p><b>DAY AND NIGHT</b> This topic is all about how day and night are created. It also links day and night on Earth to nocturnal and diurnal animals. The topic also focuses on rocks and what makes up the Earth.</p> <p><b>SUGGESTED TEXTS</b> The Owl who was afraid of the Dark.</p>	<p>What does nocturnal and diurnal mean? Which animals are nocturnal and which are diurnal? How are nocturnal animals adapted to their environment? How do seasons effect the length of days? How can rocks be grouped? What are the three categories which rocks can be grouped into? What is the process of fossil formation?</p> <p>I know that day length changes depending on the season. I know animals can be classified into nocturnal and diurnal animals. <b>I can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties I can describe in simple terms how fossils are formed when things that have lived are trapped within rock. I can recognise that soils are made of rock and organic matter.</b> I know that the Earth has an atmosphere which contains different gases.</p>	<p>What are the planets in our solar system? What order do they go in starting from the sun? Do planets float around in space or do they orbit something? Why does the sun appear to move across the sky during the day? How is day and night created? Why is it daytime and night-time in different parts of the world at the same time? Where does the sun rise and set? How does light travel? Why do shadows take the shape of the object that is blocking the light?</p> <p>I know that the Earth has a core, inner core, mantel and crust. I can name and order the planets in our solar system. I know the planets orbit the Sun. <b>I know light from the Sun can be dangerous and there are ways to protect the eyes.</b> I know that the sun appears to move across the sky over the course of a day but it is the Earth that is moving. I know that it is daytime in the part of the Earth facing the Sun and night-time in the part of the Earth away from the Sun. I know that the sun appears to rise in the East and set in the West. I can identify that the shape of a shadow is the shape of object. <b>I know that shadows are formed when the light from a light source is blocked by an opaque object. I can find patterns in the way that the size of shadows change.</b></p>	<p>Why has the earth got a magnetic south and north pole? What is special about magnetic force? What is the effect of magnetic force?</p> <p>I know the earth has a magnetic north and south pole and how this affects the Earth.</p>

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YEAR 3	Did you know?		I know that nocturnal animals have particular characteristics that are adapted to being active at night time.		I know why the earth has got a magnetic south and north pole I know is special about magnetic force. I know what the effect of magnetic force is. I know the earth has a magnetic north and south pole and how this affects the Earth.
	Skills		Ask questions about the world around them and explain that they can be answered in different ways.  Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	Ask questions about the world around them and explain that they can be answered in different ways.  Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements. Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.	Ask questions about the world around them and explain that they can be answered in different ways.  Tests can be set up and carried out by following or planning a set of instructions.
	Practicals, Experiments and writing links		Sort animals by their characteristics, referencing which are nocturnal/diurnal Group and classify based on adaptations linked to this - eyes, ear size etc.  Use sunrise and sunset data to determine when in the year daylight is longest - calculate and chart the data by month. Observe and compare different rock forms.(Igneous, sedimentary and metamorphic) Test rocks for hardness etc. Apply this knowledge to identify where rocks such as sandstone, limestone. Slate and granite have been used as construction materials (school building, local community, sea defences) and draw conclusions as to why they have been used (strength, ability to carve or split).  Writing non chronological report about rocks, including fossils.	Use a range of secondary resources to research planets and their position. Create a fact file on a chosen planet. Model of the solar system Investigate how light travels in a straight line using torches and masks, or light boxes.  Make ping pong ball models on string and use a torch to shine on the ball whilst rotating ball to show the part of ping pong ball facing the torch is in daylight etc.  Observation over time - investigate what shadows are and why they are formed. Investigate how the size of shadows change throughout the day (link to knowledge about light travelling in straight lines).  Watch video sources to find out about eclipses and present as an explanation.	Explore how a magnet had a magnet field using iron filing boxes. Use a compass to find magnet north and research why a compass points north.

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YEAR 4	Year 4 Knowledge	<b>MOONS OF THE SOLAR SYSTEM AND SPACE TRAVEL</b> This strand is all about the Moons within our Solar System and compares their orbital times. The unit also covers space travel and the forces that are required for rockets. It also focuses on space travel and man's journey to the moon. A significant person link could be Katherine Johnson, who was the American female mathematician who calculated the trajectory for America's first human space flight.  <b>SUGGESTED TEXTS</b> The Darkest Dark. A Computer called Katherine. Hidden Figures.	What are soils made from? What is evaporation? What is condensation? What part does evaporation and condensation play in the water cycle? Does temperature affect the rate of evaporation? Why is the water cycle important on Earth?  I can name the three categories of rock and explain how rocks are created using scientific vocabulary. I can explain how soil composition is influenced by the rocks in the locality. I can use my knowledge that some materials change state when they are heated or cooled and link this to rock formation. <b>I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</b> eg They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.	What is the Sun? What can you see in the night sky? What is the Milky Way? Are we apart of it? What is a moon? What is the moon made from? Is this the same as earth? Do any other planets in our solar system have moons? How long does it take for the moon to orbit the earth? Do all planets and moons have the same orbital times? Why are the different? How has space travel developed over the years?  I know that our Sun is a star. I know that our solar system is part of the Milky Way and when I look at the sky at night I can see planets, stars, galaxy and nebula. I know that planets of the solar system have moons. I know that a moon is a satellite orbiting around a planet. I can compare the different orbital times of the Moons of planets in the Solar System. I know the Moon is made from rock and compare this to Earth rocks.	What is gravity? Who discovered it? What is friction? What causes it? Can air and water resistance effect the speed an object? How does friction impact an object? What forces are used to make rockets work?  I can describe the effects of gravity. I can explain what forces are used to make rockets work.
	Did you know?			I can describe the developments of space travel.	
	Skills		Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.  Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. Scientific enquiries can be set up and carried out by following or planning a method.	Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.  Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.	Take accurate measurements in standard units, using a range of equipment.  Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. Scientific enquiries can be set up and carried out by following or planning a method.  Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.

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YEAR 4	Practicals, Experiments and writing links		<p>Sorting rock forms into categories - igneous, sedimentary and metamorphic using explanations on how they know it is this type of rock. Investigating the components of soil from different localities. Observe heating and cooling of a variety of materials and use secondary sources to compare to how rock formation is heated and cooled eg volcano.</p> <p>Create own environment in a bottle to investigate evaporation/condensation in the water cycle. Investigating changing the rate of evaporation - Where has the water gone? - Hand print on paper towels, puddles, boiling a kettle against a cold surface to see the condensation using a small amount of water and putting it into the microwave.</p>	<p>Using secondary sources to magnify the solar system to observe planets, stars, galaxy and nebula. Create a flip book to show the moon's changes in appearance over the 28 days cycle.</p> <p>Make a 3D model showing why night and day occur and explain this using the model and secondary sources to support.</p> <p>Interpret and make own sundials to show the movement of the sun. Observing and ordering types of space travel on a timeline - using secondary sources to support. Look at videos of the first moon landing -gathering of moon rock.</p>	<p>Creating and investigating own rockets and explaining what forces are used.</p> <p>Investigating air resistance - parachute investigation.</p> <p>Investigating water resistance - dropping shapes in water, making own sail boats.</p>

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YEAR 5	Year 5 Knowledge	<p><b>OUR MOON AND IT'S EFFECTS ON EARTH</b> This unit focuses on our Moon linking its 28 day cycle with the phases of the Moon and it's appearance. It also covers how our Moon effects things upon Earth such as the tides.</p> <p><b>SUGGESTED TEXTS</b> If you had your birthday party on the moon.</p> <p><b>SUGGESTED TRIPS</b> Chesterfield Barnett Observatory, Perijee and Me.</p>	<p>How does the environment of Earth compare to that of other planets in our solar system ? Why is Earth a suitable environment for plant growth and reproduction? Why can't plants survive in space?</p> <p>I understand why plants and animals are not suited to living on planets other than Earth. I can explain that Earth's qualities as a planet mean it is able to support living organism.</p>	<p>What do the words 'planets, solar system, sun, moon, rotate, orbit, spherical bodies' mean? How does the shape of an object compare to the shape of the shadow it casts? What might happen to a fixed object during the course of a day? How does the shadow of a fixed object change during the course of a day and why does this happen? What causes a lunar eclipse? What are the different phases of the moon? How does the elliptical orbit of the moon change its appearance from earth?</p> <p><b>I can describe the Sun, Earth and Moon as approximately spherical bodies</b> and begin to understand how gravity influences this. I can describe the relationships between the Earth, Sun and Moon. I can use terms such as planets, solar system, sun, moon, rotate, orbit, spherical bodies appropriately when describing the Earth, Sun, Moon and other Solar System bodies. <b>I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</b></p> <p><b>I use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. I can describe the movement of the moon relative to the Earth</b> and that the different appearance of the Moon over 28 days provides evidence for a 28-day cycle. I know the phases of the Moon. I can explain what happens to shadows during the course of the day eg gets shorter and then longer again and predict eg by drawing what the shadow will be like at an intermediate time. I can explain what causes a lunar eclipse. I know the appearance of the size and position of the Moon relates to it elliptical orbit.</p>	<p>How and why do the orbits of the different planets in our solar system differ? How long does it take each planet in our solar system to orbit our sun? What is gravitational pull? How does gravitational pull from the moon effect the tide on Earth?</p> <p><b>I can explain that unsupported objects fall towards Earth because of the force of gravity between the Earth and the falling object.</b> I can discuss the effects of gravitational pull on the earth such as tides. I know how the Moon influences the tide.</p>
		Did you know?	I know which characteristics of plants make them unsuitable to grow and reproduce naturally on any other planet.		I know the relative movement speed of different planets around the Sun.
		Skills	Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models).	Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.
		Practicals, Experiments and writing links	<p>Research other planets in the Solar System and look at their atmospheres/environments. Create Venn diagrams to compare and contrast the environments on Mars against Earth.</p> <p>Write an explanation as to why plants cannot reproduce naturally in space or on any other planet in our Solar System except Earth.</p>	<p>Moon phases - children to practically investigate how much of the Moon you can see with them acting as Earth and a torch as the Sun. Moon phases wheel dial. Moon diaries.</p> <p>Investigate and observe what happens to the shadow of a fixed object during the course of the day.</p>	<p>Create human solar system, investigate why it takes Venus less time to orbit the sun compared to Neptune.</p> <p>Research the orbits of the planets in our solar system Create a line graph showing the relationship between the distance from the sun and time it takes for the planet to complete an orbit around sun.</p> <p>Interpret data - planets mass and gravitational pull - identify correlations between the mass of the planet and the amount of gravitational pull it has.</p>

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SCIENCE UNIT			Habitats and Environment	Planets and the Solar System	Forces
YEAR 6	Year 6 Knowledge	<b>CELESTIAL MECHANICS AND EFFECTS (CONCRETE TO ABSTRACT)</b> <b>SUGGESTED TEXTS</b> George's Secret key to the Universe Earth & Space - Collins fact finders <b>SUGGESTED TRIPS</b> Chesterfield Barnett Observatory	How are humans having an impact on their environment? (Global warming). I know what global warming is and its effects.	How is a year calculated? What causes the seasons? How was the sun formed? Why do the planets orbit the sun? What is a solar eclipse? What causes the northern lights? What is the universe? What is global warming? I know it takes the Earth a year to make one complete orbit of the Sun, spinning as it goes and that it is not always easy to gain information about phenomena eg the length of a year using first-hand experience. I understand that the Universe is made up of many Solar Systems. I can explain how the planets in our Solar System orbit the Sun. I know how the sun was formed. I can explain how the Solar eclipse happens.	Why do the planets orbit the sun? How does the gravity affect our solar system? How does gravity affect the orbit of the moon around Earth? How do satellites stay in orbit and how do we use them? Why are all the planets spherical? I know that gravity is central to all celestial motion (orbits other planets). I can explain why the planets in our Solar System orbit the Sun. I know that gravity of the moon is weaker than on earth.
	Did you know?		I know that certain species have adapted in specific ways according to geographical location? I know the difference between adaptation and evolution and how adaptation directly influences evolution? I know that adaptation is the process of adjusting to match the environment and evolution refers to any changes over time. I know that adaptation is affected by geographical location and can describe some examples.	I know how the Northern Lights occur. I can explain how the tilt of the Earth and the Earth's orbit causes summer in England. I know that light travels in straight lines. I can explain why shadows have the same shape as their objects	I can apply my knowledge to explain why the geocentric model of the solar system was inaccurate. I know that the pull of gravity is the same in all directions from the central core which results in a sphere. (Link to spokes of a wheel, deflated to inflated football).
	Skills		Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.
	Practicals, Experiments and writing links		Sort images of different species according to evolutionary traits (cats, dogs, fish etc). Identify adaptations within each species and identify possible reasons for specific adaptations.	Research. How is global warming affecting the earth? Compare different view points - analyse evidence form video clips and photos - form their own opinions backing up with evidence. Look at images of a solar eclipse - explain and use torches to demonstrate. Investigate how the shadow created by the object varies in size based on distance from the light source. Is it possible for the object to completely eclipse the light source? Non-chronological report on Global warming.	Investigate the balance between internal and external pressure using balloons- relate to the spherical bodies in solar system.

		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
EYFS	EYFS Knowledge	<b>SUGGESTED TEXTS</b> We've All Got Bellybuttons! Germs are Not for Sharing Your Body, Your Senses Fairy Tales Gone Wrong: Eat Your Greens, Goldilocks (series) <b>SUGGESTED VISITOR</b> Local nurse/ dentist	Who is in your family? Who is the oldest, who is the youngest? How have you changed from when you were a baby? I can talk about my family and tell you who is the oldest and youngest. I can talk about my baby photograph and tell you what I can do now that I could not do then.	What do babies need to stay healthy? What do we need to stay healthy? What food is good for me? How do we keep our teeth clean? Who helps us in our community? (Dentist/ doctor) I can tell you what a baby needs. I can sort some healthy and unhealthy foods. I can clean my teeth with a toothbrush. I know that a dentist looks after my teeth etc.	What are the main parts of my body called? What happens to my body when I run fast? I can name the external parts of my body. I know that my heart beats faster when I exercise.
	Skills		ELG Past and Present - Know some similarities and differences between things in the past and now, drawing on their experiences and what has been read in class.	ELG Managing Self - Manage their own basic hygiene and personal needs including dressing and going to the toilet. Understand the importance of healthy food choices.	ELG Comprehension - use and understand recently introduced vocabulary during discussions.



		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
	Practicals, Experiments and writing links		Make own time line ordering baby to toddler to current photographs. Ask children to bring in family photographs to talk about in small groups - focus on vocabulary grandparents, parents etc.  What is the same, what is different?	Arrange a visit from a parent with a baby - hot seat the mummy asking questions about what the new baby does, needs etc.  Arrange a visit from a local nurse/ dentist - set up Role Play to model what they tell us about their role.  Set up a fruit tasting session - learn new vocabulary. Sort pictures of healthy and unhealthy foods.	Sing Head, Shoulders, Knees and Toes and other body part songs (My Bodyworks: Songs about Your Bones, Muscles, Heart and More! By Jane Schoenberg and Steven Schoenberg).  In outdoor learning and PE feel the effect of exercise by putting hands on chest etc.

YEAR 1	Year 1 Knowledge	<b>BASIC ANATOMY</b> This strand is about the basics of the human anatomy and what is similar/different between all living things.  <b>SUGGESTED TEXTS</b> Dem Bones, Avocado baby, Once there were Giants, tadpoles promise, The very hungry caterpillar	What happens when animals get older? eg grow into adult What happens when humans get older? How does the appearance of humans change as they get older?  I know that all animals, including humans, grow and change as they become older. I can recognise that humans' appearance changes over time eg we get taller, heavier.	What do I need to eat to keep my body healthy? What are the names of fruit and vegetables? What do humans need to stay alive? What does my body need to grow?  I know that the body needs a healthy diet to keep it healthy. I know that fruits and vegetables are part of a healthy diet. I can recognise some fruits and vegetables and name them.  I know that we need food, water and air and water to stay alive. I know that all animals, including humans, need to feed to grow and to be active.	What are the parts of my body? <b>I can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</b> I know that it is important to keep my teeth clean.
	Did you know?		I know different animals can live for different lengths of time.		
	Skills		Observe objects, materials, living things and changes over time, sorting and grouping them based on their features. Talk about what they have done and say, with help, what they think they have found out.	Ask simple scientific questions. Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features. Talk about what they have done and say, with help, what they think they have found out.
	Practicals, Experiments and writing links		Matching activities - life phases of humans/animals. Timelines.	Sorting fruit/ vegetables - Like/don't like sweet/not sweet, Seeds/ no seeds, colour, peel/no peel. Labelling fruit and vegetables and writing sentences about them.	Build a person game (like Beetle). We all have... Heads Shoulders knees and toes (add in different body parts). Labelling parts of the body - large scale diagram. Disclosing tablets-teeth cleaning.

		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
YEAR 2	Year 2 Knowledge	<b>BASIC ANATOMY</b> This strand is about the functions of basic anatomy and what parts of the body do what. It also explores how plants and animals receive food.  <b>SUGGESTED TEXTS</b> Funny Bones, Handa's Surprise, Oliver's Vegetables, Oliver's Fruit Salad	How do humans change as they grow into adults? How can appearance change? How do you know whether something is alive, dead or has never lived? How have I changed since birth?  <b>I notice that animals, including humans, have offspring which grow into adults.</b> I can recognise that some features of appearance can be changed eg length of hair but others are difficult to change or cannot be changed eg colour, shape of face. <b>I can say whether things are alive, dead or have never lived.</b> I can say how I have changed since birth and suggest ways in which I might change as I grow.	What do our bodies need from food to be healthy? What do our bodies need to grow? Why is hygiene important to humans? Why do humans have to exercise? Why is it important for our bodies/minds?  <b>I understand the basic needs of animals, including humans, for survival (water, food and air) and the main changes as young animals, including humans, grow into adults.</b> I know that the body needs a balanced diet which is varied diet to keep healthy eg we shouldn't have too many sweet things, we should have a variety of fruit and veg. <b>I can describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</b>	Why do humans have teeth? What do teeth do? What is the job of the heart? What are the five sense and what do they do? What are the names of the main internal organs in the body?  I can identify basic internal organs (brain, heart, stomach, lungs). I can identify the different types of teeth in humans, that their teeth are deciduous and their simple functions.
	Did you know?				I know that different types of exercise can help different body parts.
	Skills		Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.  Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.  Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.	Ask and answer scientific questions about the world around them.
	Practicals, Experiments and writing links		Changes explanation booklet. Comparison -sorting pictures/object that are alive, dead or have never lived, Explain reasons for sort. Survey class characteristics - eye colour, hair colour, height, age, etc.	Food diaries. Practical - use blender/juice bike from Mellors to create own fruit smoothies ( <a href="#">link to forces</a> ). Preferences test - offer a range of party foods (healthy/non healthy) children select and then survey which is the most /least popular and whether people have made healthy choices.	Writing Information booklets on senses/parts of the human body. Grouping/comparing according to senses. Adding organs to a large scale diagram - where are they located? Devise exercises for different body parts in PE. Observe and match teeth to purpose. - cut tear grind. Sensory deprivation experiences - blindfold pairs obstacle course, feely boxes, smelly boxes, Blindfold tasting, how far away can you hear? Listening walks outside. etc.



YEAR 3	Year 3 Knowledge	<p><b>FUNCTIONS OF ANATOMY - PART 2</b> This strand compares the functions of anatomy in living things and looks at how we can group and classify living things.</p> <p><b>SUGGESTED TEXTS</b> Dr Dog.</p>	<p>What stages are in the life cycles of humans? What happens during each stage of the human life cycle?</p> <p>I know that all humans have a life cycle and that this generally develops from youth, to young adulthood, to adult to old age. I can order on a timeline stages of human growth. I can identify and describe the characteristics of each life stage.</p>	<p>What are the main food groups? What foods are in each food group? What is the importance of each food group for our bodies?</p> <p><b>I can 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.</b> I know examples of carbohydrates, proteins and dairy and fat and vitamins and minerals.</p>	<p>What bones are part of the humans skeleton? Why is the skeleton important? Why do we have muscles? How do muscles help us to move? Which organs belong to the main body systems (circulatory, respiratory and digestive)?</p> <p><b>I know that animals, including humans, have skeletons and muscles for support, protection and movement.</b> I know that our body has organs which help us like the lungs which help us breathe. I know the heart is part of the circulatory system which transports blood around our bodies through arteries and veins. I know that our digestive system helps us to break down food.</p>
	Did you know?			I know what types of nutrition animals need to survive, including basic food groups and how those food groups maintain good health eg muscles need protein	
	Skills		Ask questions about the world around them and explain that they can be answered in different ways.	Make increasingly careful observations, identifying similarities, differences and changes, and making simple connections. Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams.	Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.
	Practicals, Experiments and writing links		Use a range of secondary resources to research reproduction. Order the stages of human life newborn, toddler, young child, older child, adolescent, young adult, middle -aged adult, elderly person - describe the developmental differences for each stage. Create a life timeline to show human cycle.	Create food pyramids. Organise to take children on a visit to a local supermarket to look at the different foods available. Group foods into categories - proteins, fats, carbohydrates, vitamins & minerals. Plan, write and describe three different balanced meals for people - How will you make sure each person is able to eat a balanced diet despite their dietary restrictions? Research health problems linked to unhealthy lifestyles.	Group and classify bones according to their characteristics. Comparison tables - writing sentences about comparison. Use a range of secondary resources to research similarities and differences. Investigate how the digestive system works by creating poo. Make a lift the flap book explaining the digestive system (Plop up book).

		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
YEAR 4	Year 4 Knowledge	<p><b>DIET AND EXERCISE</b> This strand is about the importance of a healthy lifestyle including diet and exercise. It links how our food is digested, transported around the body and then how the nutrients are used in different ways within the body.</p> <p><b>SUGGESTED TEXTS</b> Where did my bean Burger go? The Little Mole who knew it was none of his business.</p>	<p>What are the differences in capabilities of newly born animals and humans? What is the difference between the length of time humans and animals are dependent upon their parents?</p> <p>I can describe differences in capabilities of newly born humans and other animals eg in movement, feeding, I can recognise differences in the length of time humans and other animals are dependent upon parents.</p>	<p>What is the impact of each food group on the human body? What is their importance with regards to nutrition and health? What happens to our muscles when we exercise?</p> <p>I know the role of each food group to the body and their importance to nutrition and health. I know that different types of exercise can help different body parts. I know that we need exercise to stay healthy and to maintain our muscles and that when we exercise, our muscles work harder.</p>	<p>What are the functions of particular bones? Why do we have different shaped teeth? How is food and water transported throughout the body? What are the basic parts and functions of the digestive system?</p> <p><b>I describe the simple functions of the basic parts of the digestive system in humans. I can identify the different types of teeth in humans and their simple functions.</b></p>
	Did you know?			I know that different people may have different dietary requirements eg children need a certain amount of protein for growth.	I know the function of bone marrow.
	Skills		Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.	Take accurate measurements in standard units, using a range of equipment. Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. Scientific enquiries can be set up and carried out by following or planning a method.	Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.
	Practicals, Experiments and writing links		<p>Create a graph to show and compare dependency on adults.</p> <p>Look at Time-lapse films to observe the changes of growth over time.</p>	<p>Sample foods high in each food group.</p> <p>Compare a range of products for their nutritional value according to their packaging. Compare traffic light for nutritional labelling. Research into vitamin deficiency and the effects this has on the body eg skurvy (using secondary sources).</p> <p>Create own models of antagonistic muscles to show how these pull to work together when exercising.</p>	<p>Label a model skeleton and mouth (teeth).</p> <p>Compare of different types of joints in a human skeleton. Investigate the functions of different teeth, looking at the shape of the teeth(what they are protecting) and what they are utilised for. Draw and label the digestive system and show how food is transported. Investigate how food is broken down in the stomach - stomach acid experiment using alka seltzer and oil/water</p> <p>Comparison of teeth of herbivores and carnivores through pictures.</p>

		TOPICS	LIVING THINGS - HUMANS			
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms	
YEAR 5	Year 5 Knowledge	<p><b>CHANGES AND ADAPTATION</b> This strand is about life cycles and how living things change over time and to adapt to their environment. It stresses the impact of exercise and a healthy diet and should link to the Physical Activity lessons.</p> <p><b>SUGGESTED TEXTS</b> Charlotte's Web</p>	<p>In which ways do human and animal offspring usually mirror their parents? In which ways can human and animal offspring differ from their biological parents? What are the different stages of growth and development in the life of an average human? What happens to the human body during puberty and why?</p> <p><b>I can describe the changes as humans develop to old age. I recognise particular stages in the growth and development of humans, such as puberty.</b></p>	<p>Why is exercise important? Why is it important to have a healthy diet? What can happen if we don't lead a healthy lifestyle? How do you calculate food requirements?</p> <p>I can describe the importance of exercise for humans, eating the right amounts of different types of food and that an imbalance of certain types of food can lead to disease. I can calculate food requirements for a healthy diet, using information provided.</p>	<p>What are the main organs in the human body and where are they located? What is the basic function of each main organ in the human body? How is a pulse rate measured? Does everyone have the same heart rate? How is a pulse rate related to heart beats? What happens to your heart rate when you exercise and why does this occur? How does increased blood supply help your muscles during exercise and why is this important?</p> <p>I can label the main organs of the body and name their basic function. I know how to measure pulse rate and relate it to heart beat, I can describe how, when humans exercise, muscles move parts of the skeleton and this activity requires an increased blood supply, so the heart beat increases and the pulse rate is faster. I know that exercise causes an increase in gaseous exchange. (Need to expel more carbon dioxide).</p>	
	Did you know?				I know that athletes train their bodies to work more efficiently and have better recovery times.	
	Skills		Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Ask a wide range of relevant scientific questions that broaden their understanding of the world around them and identify how they can answer them.		Plan and carry out a range of enquiries, including writing methods, identifying variables and making predictions based on prior knowledge and understanding. A method is a set of clear instructions for how to carry out a scientific investigation. Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models).
	Practicals, Experiments and writing links		<p>Human time line - include the important changes during each stage - eg: babies (attachment dependent, brain development), toddlers (exploration, brain development, fine motor skills), teenager (puberty) etc.</p> <p>Look at photographs of our family - talk about how we are similar to our parents, what have we inherited from them? Look at skin colour, hair colour, eye colour, height, facial features.</p>	<p>Research health problems linked to unhealthy lifestyles - diabetes, heart disease, being overweight, Look at food packages - RDA for children, adults (men/women), compare traffic light system, talk about calories, fat (saturated and unsaturated), energy, fibre, salt content, sugar. Compare the amount of sugar in certain foods - make sugar towers. Use nutritional information from food packages/ data to calculate if an adult has exceeded their RDA of calories, fat, sugar or salt.</p>	<p>Investigation - what type of exercise increases your HR the most? Practical - finding pulse, measuring and recording data, compare with one another, do we all have the same heart rate? Draw around our bodies and draw/label the main organs. Group organs into the body system they are involved in. Create a linked spider diagram/concept map to show how the organs and systems within the human body can be linked with one another. Make balloon lungs in a bottle.</p>	

		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
YEAR 6	Year 6 Knowledge	<p><b>EVOLUTION AND ADAPTATION</b> This strand is about evolution and the development of the human body and how.</p> <p><b>SUGGESTED TEXTS</b> Pig Heart Boy (Heart and circulation) One Smart Fish (evolution) Island - A Story of the Galapagos Little Changes (evolution)</p>	<p>What is inheritance? Why do we inherit particular characteristics from our parents? What characteristics can we inherit? What is adaptation? How have living things adapted to suit their environments? How have some living things changed over time? What is evolution? What is the theory of evolution? How have humans evolved over time? How has the skeleton of a human changed and why?</p> <p><b>I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. I can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</b> I can describe and compare the bodies of some homin species and how they evolved for different purposes - climbing / walking. I can use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved.</p>	<p>How does diet, exercise and drugs affect how our bodies function? What do we need for our bodies to function well? What health problems can result from eating an unbalanced diet/ unhealthy lifestyle?</p> <p><b>I can recognise the impact of diet, exercise, drugs (medicines and recreational drugs) and lifestyle on the way their bodies function.</b></p>	<p>What is the circulatory system and why do we need it? Which parts of our body make up the circulatory system? How does the circulatory system work? How does the heart work? What are blood vessels and what do they do? What are the components of blood and what is their function? How is water and nutrients transported within the body? How does a poor lifestyle affect how the circulatory system works?</p> <p><b>I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. I can describe the ways that nutrients and water are transported within the human body. I can recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</b></p>
	Did you know?		I can explain how the development of the skeleton during evolution helped humans to walk and run such as a narrower pelvis for upright walking.	I can relate deficiency diseases to diet. I can describe possible health effects of unbalanced diets from data provided. Such as calcium deficiency -rickets, scurvy and anaemia etc.	
	Skills		Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.	Choose an appropriate approach to record accurate results, including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge.	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.

		TOPICS	LIVING THINGS - HUMANS		
SCIENCE UNIT		Basic Anatomy	Growth and Reproduction	Human Needs	Human Systems and Organisms
YEAR 6	Practicals, Experiments and writing links		<p>Make comparisons - similarities and differences between offspring and parents - what has been inherited?</p> <p>Labelled diagrams of how the human body has evolved. Timelines.</p>	<p>Research health problems linked to unhealthy lifestyles. First aid training - Produce a leaflet of how to keep a healthy heart - what to do in an emergency if someone is unwell. CPR British Heart Foundation - heart start training.</p> <p>Pattern seek - any patterns in health related issues and age, sex, amount of exercise, diet - positive /negative correlations.</p>	<p>Labelled diagram of the heart. Research the circulatory system. Make blood - look at the components in comparison to each other. Straw investigation (fair test) - different thicknesses - how does this affect blood flow? Investigate how fluids travel under different pressures -hydraulic systems - relate to narrowing of arteries. Dissect a pig's heart.</p> <p>Written explanation of how blood flows through the heart Non-chronological report on components of blood.</p>

		TOPICS	LIVING THINGS - PLANTS AND ANIMALS	
SCIENCE UNIT		Basic Anatomy	Plants	Animal Kingdom
EYFS	EYFS Knowledge	<p><b>BASIC ANATOMY</b> This topic is about the basics of plants and animals.</p> <p><b>SUGGESTED TEXTS</b> Little Acorns, Oliver's Vegetables, Growing Vegetable Soup, The Enormous Turnip, Dora's Eggs, The Odd Egg, A Mighty Bitey Creature, Owl Babies</p> <p><b>SUGGESTED VISITS</b> Cannon Hall Farm, Wentworth Farm/ Gardens, Clumber Park.</p>	<p>Where do vegetables come from? What plants and flowers can we find in our outdoor environment? How did they get there? What are their names? What do our seeds need to be able to grow? What is happening to the trees outside? What are the four Seasons? What happens to the trees in Autumn?</p> <p>I can take care of a seed by giving it water and sunlight. I can name some plants and flowers. I know that some vegetables like carrots start their life from tiny seeds. I know that the leaves on the trees change and fall during Autumn. I know that the seasons change and so does the weather and I wear clothes which are appropriate to the season.</p>	<p>What animals can we have for family pets? What do pets need to stay healthy? What animals live in the wild - why would they not make a good pet? What do wild animals need to stay alive? What animals live in our woods/ on the farm? Where do chicks/ butterflies/ frogs come from?</p> <p>I can name some animals and their babies. I know that different pets need different things. I can match some animals to their habitat. I know the life cycle of a chick/ butterfly/ frog.</p>
	Skills		ELG The Natural World. 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. Understand some important processes and changes in the natural world around them, including seasons	ELG The Natural World. 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.
	Practicals, Experiments and writing links		Create a vegetable patch in outdoor area - make signs, labels and scarecrows. Plant potatoes in grow bags. Go on a scavenger hunt to find 5 different coloured flowers - find out their names, paint pictures from direct observation. Plant own sunflowers/ beans/ seeds to take home and look after - write a 'Care for me' list Collect Autumn leaves to create Atelier/ transient artwork.	Talk about own pets. Arrange visits from parents with a pet. Create a photo montage of class pets. For children without a pet, which pet would they like the most? (Draw picture). Read books about wild animals - how are they different? Go on a wild walk through the woods - what signs of life can we spot? Lift up tree trunks etc and search for bugs. Match baby and mummy animals. Grow your own butterfly/ observe tadpoles to frogs in the classroom.

YEAR 1	Year 1 Knowledge	<p><b>BASIC ANATOMY</b> This topic is about the basics of the plant structure and the needs of animals.</p> <p><b>SUGGESTED TEXTS</b> Avocado Baby, Tadpole's Promise, The Gruffalo, Ten Seeds, The Tiny Seed</p>	<p>What are the names of plants? What different types of plants are there? What are the parts of a plant? What does a plant need to grow? What are the four seasons of the year and what changes can we observe?</p> <p><b>I can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. I can observe changes across the four seasons (trees / plants). I can identify and describe the basic structure of a variety of common flowering plants, including trees.</b></p>	<p>What are the names of different animals? How can we group animals? Why/How are animals different? Where do animals live? What do animals eat? What is a herbivore/carnivore/omnivore? What does the body of an animal look like?</p> <p><b>I can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. I can identify and name a variety of common animals that are carnivores, herbivores and omnivores. I can describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</b></p>
	Did you know?		I know the basic needs of a plant for growth.	I can distinguish between different types of animal, where they live and what they eat.
	Skills		Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.	Ask simple scientific questions.
	Practicals, Experiments and writing links		Labelling parts of the plant. Growing seeds in a jar - observing roots, etc. Observe quick germination with cress, measure growth of runner beans, amaryllis grown in gel. Observing seasonal changes in the school grounds (change over time). Sorting things collected - leaves, seeds, twigs, flowers.	Types of animals booklet. Comparison of differences between animals/species.



		TOPICS	LIVING THINGS - PLANTS AND ANIMALS	
SCIENCE UNIT		Basic Anatomy	Plants	Animal Kingdom
YEAR 2	Year 2 Knowledge	<p><b>BASIC FUNCTIONS OF ANATOMY</b> This topic is about what plants need to be able to grow and stay alive. This links to habitats of plants and animals and why they live in particular habitats.</p> <p><b>SUGGESTED TEXTS</b> A child's garden, The dandelion seed, Monkey Puzzle, Tadpole's Promise, The Sunflower Race, Caterpillar and Bean</p>	<p>How do we know that a plant is a living thing? How do we know a plant is alive? What is a seed?/How do seeds grow? What is a bulb/How does a bulb grow? What do plants need to grow? What habitats do different plants live in? Why are plants important in a food chain?</p> <p><b>I can explore and compare the differences between things that are living, dead, and things that have never been alive. I can observe and describe how seeds and bulbs grow into mature plants. I can identify and name a variety of plants in their habitats including micro habitats. I can find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</b></p>	<p>How do animals get their food?/Where do they get their food from? What is a food chain? What is a habitat? What is a micro habitat? Why do animals/plants live in their habitat? What happens to babies as they grow?</p> <p><b>I can 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. I notice that animals, including humans, have offspring which grow into adults. I can identify and name a variety of animals in their habitats, including micro habitats.</b></p>
	Did you know?		I know that plants are the first stage of a food chain. I know that plants and animals depend on one another in a habitat.	
	Skills		Ask and answer scientific questions about the world around them. Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions. Use simple equipment to measure and make observations. Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language. Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.	Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy. Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.
	Practicals, Experiments and writing links		Explanation booklet about plants - How do we know a plant is alive? Looking at patterns over time of things planted. Fair test experiment - growing plants from a seed/bulb in different conditions (light/dark water /no water). Investigating different types of plants and what they get from their habitat eg cacti do not need much water as they live in the desert.	Identifying and making own micro habitat indoors/outdoors eg miniature garden/miniature pond using a bowl - what animals do we think might visit the micro habitat? Use a range of secondary resources to research similarities and differences between habitats. Build food chains for different animals. Observe the change from frog spawn to tadpole to frog, identifying stages of growth and abilities.
YEAR 3	Year 3 Knowledge	<p><b>FUNCTIONS OF ANATOMY - PART 2</b> This topic compares the functions of anatomy in living things and looks at how we can group and classify living things.</p> <p><b>SUGGESTED TEXTS</b> Once upon a Jungle, I am the seed that grew the tree</p> <p><b>SUGGESTED TRIPS</b> Think Tank - Birmingham Science Museum</p>	<p>What are the functions of different parts of flowering plants? How do plants live and grow? Does this vary from plant to plant? How is water transported within plants?</p> <p><b>I can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. I can 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. I can investigate the way in which water is transported within plants. I can explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</b></p>	<p>How can living things be grouped? What do young animals look like as adults? Can these be matched? What nutrition do animals need to survive? How and where do animals get their nutrition?</p> <p><b>I can identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</b></p>
	Did you know?		What is the lifecycle of flowering plants? What are soils made from?	
	Skills		Ask questions about the world around them and explain that they can be answered in different ways.	Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams.
	Practicals, Experiments and writing links		Carrying out comparative and fair tests to observe the amount of roots that grow. Create a table to show the increase in roots over a set number of days. Plan and carry out an observation on how plants transport water - ink dye experiment. Use magnifiers to observe the composition of different soils, sieve to separate particles in the soil. Draw conclusions from investigatory work. Write up to findings.	Group and classify based on characteristics- leading to sorting animals into the different vertebrate and invertebrate groups. Create branching diagrams from the various animal groups. Research sources of food for the different animal groups - identify herbivores, carnivores and omnivores. Match X-rays to the corresponding animal, explaining reasons of physiology for match. Draw conclusions from investigatory work. Create Top Trumps cards for various animals.

		TOPICS	LIVING THINGS - PLANTS AND ANIMALS	
SCIENCE UNIT		Basic Anatomy	Plants	Animal Kingdom
YEAR 4	Year 4 Knowledge	<p><b>FOOD CHAINS</b> This topic is about classifying and grouping plants and animal based on particular characteristics. This unit also introduces food chains and links together how plants and animals are dependent on one another within food chains.</p> <p><b>SUGGESTED TEXTS</b> Tadpole's Promise (Life cycles) Charlotte's Web (Life cycles)</p> <p><b>SUGGESTED TRIPS</b> Think Tank - Birmingham Science Museum</p>	<p>How does soil help plants grow? How can living things be grouped? How can classification keys be used to help group living things? What are environments and how can these change over time?</p> <p><b>I can recognise that living things can be grouped in a variety of ways. I can explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. I can recognise that environments can change and that this can sometimes pose dangers to living things.</b></p>	<p>What are food chains and how do these help us identify producers, predators and prey? How can classification keys help us group, identify and name a variety of living things in their environment? What is a life cycle and what do they show? How are nutrients and water transported within animals and humans?</p> <p><b>I know how to construct and interpret a variety of food chains, identifying producers, predators and prey. I can recognise that living things can be grouped in a variety of ways. I know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment. I can recognise that environments can change and that this can sometimes pose dangers to living things.</b></p>
	Did you know?		I know that soil composition helps a plants growth.	I know that all animals have a life cycle and that this generally develops from youth, to young adulthood, to adult to old age.
	Skills		Gather, record, classify and present observations and measurements in a variety of ways (pictorial representations, timelines, diagrams, keys, tables, charts and graphs).	Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.
	Practicals, Experiments and writing links		Carrying out comparative and fair tests using different type of plants - different seeds planted into plastic bags to observe the amount of roots that grow in soil. Recording using a table to show the increase in roots over a set number of days and it's correlation to stem and leaf growth. Compare this growth in a seed and a bulb. Create your own food web. Draw conclusions from investigatory work. Create a chart to group living things according different criteria/characteristics. Write an explanation text to show findings.	Research and create food chains, identifying producers, predators and prey, comparing and contrasting food chains for different animals. Grouping and identifying a variety of different animals a living things. Use a range of classification keys to sort animals for habitat food, adaptation, type of reproduction etc. Explain how water is transported from the digestive system to the circulatory system.
YEAR 5	Year 5 Knowledge	<p><b>CHANGES and ADAPTATION</b> This topic is about life cycles and how living things change over time and to adapt to their environment. It stresses the impact of exercise and a healthy diet and should link to the Physical Activity lessons</p> <p><b>SUGGESTED TEXTS</b> The Story of frog belly Rat Bone</p>	<p>What are the different ways in which plants reproduce ? What are the different ways in which plants can be classified? What factors might you take into accounts when deciding ways to classify different plants? How does the habitat of a plant effect the way it disperses it's seeds?</p> <p><b>I can describe the life process of reproduction in some plants.</b></p>	<p>How do the life cycles of amphibians, mammals, insects and birds differ? What are the different ways in which animals reproduce? How do the lengths of time that different animals depend on their mother compare to each other? What are the different ways in which animals can be classified? What factors might be considered when classifying animals into different groups?</p> <p><b>I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. I can describe the life process of reproduction in some plants and animals.</b></p>
	Did you know?			I can recognise differences in the length of time humans and other animals are dependent upon parents.
	Skills		Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.
	Practicals, Experiments and writing links		Floral dissection - look a parts of the plant that are used in plant reproduction. Research pollination and seed dispersal. Flowering plant life cycle- time line. Group and classify plants based on how their seeds are dispersed. Local trip - travel to different local areas and collect plants - try and find plants that have different seed dispersals. Link seed dispersal and habitat.	Research where offspring development occurs in animal groups - external laying eggs (reptiles, amphibians, fish, birds), internally live young (mammals). Use research to compare and classify animals based on where their offspring develops, how long they develop for, number of young etc. Create line graphs to compare data collected. Make animal top trumps - animal group, fertilization (internal/external), development of offspring (internal/external), development time, number of young, survival rate, time dependent on parents.

		TOPICS	LIVING THINGS - PLANTS AND ANIMALS	
SCIENCE UNIT		Basic Anatomy	Plants	Animal Kingdom
YEAR 6	Year 6 Knowledge	<p><b>EVOLUTION AND ADAPTATION</b> This topic is about evolution and the development of the human body and how.</p> <p><b>SUGGESTED TEXTS</b> One Smart Fish, Island - A story of the Galapagos, Little Changes</p>	<p>Why are offspring different to their parents? What is adaptation? Why do plants and animals adapt to the environment they are living in? How can adaptation affect evolution? <b>I can 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. I can give reasons for classifying plants based on specific characteristics. I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. I can identify how plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</b></p>	<p>Why do plants and animals need to adapt to their environment? How have some living things changed over time? Why are animals classified because of certain characteristics? What are fossils? How can fossils give us information about the past? <b>I can 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. I can give reasons for classifying animals based on specific characteristics. I can identify how animals are adapted to suit their environment in different ways and that adaptation may lead to evolution. I can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. I can describe the ways in which nutrients and water are transported within animals, including humans.</b></p>
	Did you know?			
	Skills		Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.	Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge. Independently, decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.
	Practicals, Experiments and writing links		Research. Identify characteristics that help plants/animals survive in certain environments. Labelled diagrams. Dissect cacti and common plant compare different features e.g. differences in leaf thickness & ability to store water, root structure & defensive adaptations -spines.	Research. Identify characteristics that help plants/animals survive in certain environments. Labelled diagrams. Compare diagrams - evolution of certain animals - explain. Breeds and species - compare animals to their parents (similarities and differences). Design a new breed. Group adaptations according to habitat & sub groups within the habitat ( polar species tend to be white, desert species can store water).

		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD					
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People	
EYFS	EYFS Knowledge	<p><b>ME AND MY SENSES</b> This focuses on what my senses do to help me to find out about the world in which I live.</p> <p><b>SUGGESTED TEXTS:</b> My Five Senses. Iggy Peck Architect. Callum's Incredible Construction Kit. Flashlight. Wow said the owl.</p> <p><b>SUGGESTED VISITORS:</b> Kid Knex from Family Learning</p>	<p>How do we see? What colours are all around me? How many colours are in a rainbow? What animals come out at night? What lights the sky in the day and at night?</p> <p>I know that my eyes enable me to see. I can name the different colours. I know that some animals are nocturnal. I know that the sun and moon create light.</p>	<p>How do we hear? What sounds do animals make? What sounds can we make with our voice/ instruments/ bodies? What is a loud sound, what is a quiet sound?</p> <p>I know that my ears enable me to hear. I can distinguish between the sounds that different animals make. I can create loud and quiet sounds using a range of instruments etc.</p>	<p>What happens when we switch off the lights? What happens when we turn off the power to the computer? Why?</p> <p>I know that we need switches and electricity to make some things work.</p>	<p>What happens when we build a ramp for the wheeled toys? What happens we build the ramp higher? What do we do to the rope to make the pulley system work? What happens if we push?</p> <p>I can build a ramp and make cars go faster and slower. I can use a simple pulley system to transport equipment and objects.</p>	<p>What is my house made from? What is the difference between a house brick and a wooden block? What are the toys made from in our classroom? What happens to ice when it gets hot/ cold? What happens to chocolate?</p> <p>I can sort and name the materials - wood, plastic, glass and metal. I know that water can freeze and also melt. I know that an oven makes things hot and a fridge makes things cold.</p>	<p>Who was Beatrix Potter?</p> <p>I can talk about and name some of the animals in Beatrix Potter's books.</p>
	Skills		ELG Listening. Listen attentively and respond appropriately when being read to and during whole class and small group discussions. Make comments about what they have heard and ask questions to clarify their understanding Hold conversation when engaged in back and forth exchanges with their teachers and peers.	ELG Speaking. Participate in small group, class and 1-1 discussions, offering their own ideas, using new vocabulary. Offer explanations for why things might happen, making use of new vocabulary. Express their ideas using full sentences with modelling and support from their teacher.		ELG Self-regulation. Have a positive sense of self and show resilience and perseverance in the face of challenge. Pay attention to their teacher and follow multi-step instructions.	ELG Creating with Materials. Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	ELG Listening Listen carefully and respond appropriately when being read to and during whole class and small group discussions.
	Practicals, Experiments and writing links		Draw and paint using different coloured media. Explore what happens when you mix colours (brusho/ marbling effect). Find out about nocturnal animals and sort day and night creatures Create a small world woodland scene with day and night animals Explore bubbles outside looking for rainbows in bubble puddles".	Play animal sounds bingo. Explore percussion instruments and group into the different sounds they make. Sing songs and create own songs using body sounds to accompany our singing.	Read Flashlight by Lizi Boyd.	Explore ramps and wheeled toys in the construction area. Add different sized planks/ bricks etc and tape measures. Provide challenges in the outdoor area to transport heavier buckets to different areas using a simple rope pulley system.	Create rubbing's using large paper and wax crayons outside Handle different materials and sort into groups. Build a den for Mr Fox - what is the best material to keep him safe and dry? Test it out. How can we make a snowball last forever? Discover tiny animals trapped inside ice - how can we free them? Baking activities.	



		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD					
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People	
YEAR 1	Year 1 Knowledge	<p><b>TECHNOLOGY AROUND ME</b> This strand is around the technology and forces around us. Within this strand a significant person is studied.</p> <p><b>SUGGESTED TEXTS</b> Oscar and the Moth: A Book About Light and Dark, Fox in the night, Egg Drop by Mini Gray, Paper bag Princess</p>	<p>Why do we need light? What is light for? What part of my body do I use to see? Why can I not see well when it is dark?</p> <p>I know that things in the home have a source of light eg. Microwaves, torches and that these things need power to create light. I know that I use my eyes for my sense of sight and that this helps me to learn about the world around me.</p>	<p>What can I hear? What part of my body do I use to hear? What would it be like if I could not hear things?</p> <p>I can identify and make loud and quiet sounds. I know that I use my ears for the sense of hearing.</p>	<p>What things use electricity?</p> <p>I can name some of the things that use electricity. I know that some things work by using electricity.</p>	<p>What do wheels do? How do they move?</p> <p>How do things move? I know I can move things with a push and a pull. I know that wheels are used for vehicles to move/travel I understand that there are many sorts of movement which can be described in many ways. I can recognise risks to myself when objects are moving.</p>	<p>What is a material? What are different types of materials? What material is an object made from? What do objects/materials have in common? How can materials change?</p> <p><b>I can distinguish between an object and the material from which it is made. I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. I can describe the simple physical properties of a variety of everyday materials. I can compare and group together a variety of everyday materials on the basis of their simple physical properties.</b></p>	<p>Who is Thomas Edison? When did he live? What did he invent? I know Thomas Edison invented the light bulb. I know that Thomas Edison invented the light bulb. Links to prior learning / other areas / incidental learning Link to light and light sources in the home.</p>
	Did you know?		I know that I need light to be able see.	I can identify different sounds in my environment.		I recognise that it is not only ourselves that make things move by pushing.		I know when Thomas Edison was born.
	Skills		Talk about what they have done and say, with help, what they think they have found out.	With support, use simple equipment to measure and make observations.	With support, use simple equipment to measure and make observations.	With support, follow instructions to perform simple tests and begin to talk about what they might do or what might happen. With support, use simple equipment to measure and make observations.	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features. With support, gather and record simple data in a range of ways (data tables, diagrams, Venn diagrams).	Ask simple scientific questions.
	Practicals, Experiments and writing links		Look for light sources around school. Make a dark den. Investigate different torches/ different coloured light sources, effect of turning lights on and off.	Going on a sound hunt around school. Sound recognition game - what made the sound? Identify loud and quiet sounds.	Sorting toys - which needs electricity to work? Noticing patterns of function of the toys Writing information booklet about everyday objects which use electricity.	Carrying out comparative and fair tests. Describe how movement starts and stops with a push/pull. Identify objects we move with a push or pull. Observe how wheels turn and how wheels make directional movement easier. Writing speech bubbles about findings.	Name different materials - paper, cardboard, wood, metal, plastic, glass etc. Sort objects made from different materials. Observe, sort and discuss materials according to characteristics - hard/soft, rough/smooth, heavy/light wet/dry, shiny/non-shiny, coloured/clear, etc. Grouping and classifying materials according to their properties Comparison tables - writing sentences about comparisons.	
YEAR 2	Year 2 Knowledge	<p><b>TECHNOLOGY AROUND ME</b> This strands builds on the idea of technology at home and at school.</p> <p><b>SUGGESTED TEXTS</b> Oscar and the Bird: A Book about Electricity, Thomas Edison: the Man Behind the Light Bulb. Mr Gumpy's Motor Car by John Burningham. One Plastic Bag: Isatou Ceesay and the Recycling Women of Gambia, The smartest giant in town</p>	<p>What can make light? What do you do to make a light work?</p> <p>I know that objects can create sounds. I can use instruments and my voice to create sound. I can describe that there are many different sources of sounds. Links to prior learning / other areas / incidental learning Music lessons.</p>	<p>What can make sounds? What types of sounds do different objects make?</p> <p>I know that electricity is used within the house and around me. I understand that a battery can power a simple circuit. I can create a simple circuit to light a bulb.</p>	<p>How do I use energy? How does a vehicle move? What is a push and a pull? What is friction? What does friction do?</p> <p>I know that when I use things like a scooter or a bike that I am using energy. I understand that when a vehicle moves it is caused by a force. <b>I can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</b> I understand that I can push and pull an object and that other things can push objects I understand that friction can stop the movement of a vehicle.</p>	<p>What are different materials suitable for? How are they used?</p> <p><b>I can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. I can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</b></p>	<p>Who is an important scientist in this area and what did they help discover or know? Who is Leo Hendrik Baekeland? When did he live?(1863-1944) What did he invent? I know Leo Hendrik Baekeland invented Bakelite plastic. I can identify objects made from Bakelite I can explain the impact this new material had. Link to materials and suitability of materials.</p>	
	Did you know?		I can control man-made light (I can blow candles out and turn the lamp off). I know that natural light comes from the sun. I can name some different sources of light. I know that electricity can generate light.	I can predict how loud a sound may be.				

		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD				
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People
YEAR 2	Skills	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.	Use simple equipment to measure and make observations.	Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.	Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning. Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.	Ask and answer scientific questions about the world around them.
	Practicals, Experiments and writing links	Sort light sources and discuss how we control them (turn off, Blow out etc). Observe the differences between the effect of natural light in the classroom and that of artificial light.	Explore the sounds produced by different instruments. (volume, sound quality etc). Investigate how to manipulate the volume of the sound make by a drum (percussive force). Draw conclusions from investigatory work. Write up to findings.	Instruction Writing on how to make a simple circuit Practical - Using snap circuits to make a simple circuit. Identify objects in the home which are powered by electricity and which use batteries or mains electricity.	Carrying out comparative and fair tests - Visit a playground and explore motion equipment - swings, slides, roundabouts etc. How do we move - start and stop. How do different vehicles travel? Wheeled vehicles - ramps/flat. How do wheeled vehicles travel across different surfaces?	Observe and discuss the materials different objects have been made from and why that material has been chosen - plastic for a waterproof coat, glass for a jar, wool for a jumper, paper towels to dry hands etc. Grouping and classifying- based on suitability. Carrying out comparative and fair tests on materials to find out their suitability for purpose. Making home made playdough to observe how materials can be manipulated. Compare how rigid or non rigid objects respond differently to manipulation . Writing links - non-chronological report on materials and their uses.	
YEAR 3	Year 3 Knowledge	<p><b>TECHNOLOGY THAT HELPS US</b> This strand builds on the idea of how different technology can help us to achieve things that the human body can't do.</p> <p><b>SUGGESTED TEXTS</b> Three Little Pigs (materials) Charlie and the Chocolate Factory (States of Matter) Iron Man (magnets)</p> <p><b>SUGGESTED TRIPS</b> Think Tank - Birmingham Science Museum</p>	<p>How do we see objects? Are there different light sources? What are the comparisons between light sources in terms of colour and brightness? Why can't some people see? How can technology help improve people see?</p> <p>I can explain that objects are seen because they give out or reflect light into the eye. I can identify a number of light sources of different kinds. <b>I know I need light in order to see things and that dark is the absence of light. I know that light is reflected from surfaces. I know that shadows are formed when the light from a light source is blocked by an opaque object. I can find patterns in the way that the size of shadows change.</b> I can make comparisons between light sources in terms of colour and brightness.</p>	<p>What is the difference between volume, pitch and tone and echo? What can we use sound for? How does sound travel? How can technology help improve people's hearing?</p> <p>I can make observations of sounds by listening carefully and distinguish between volume, pitch and tone and echo. I know that sound can be used for different purposes such as alarms, communication and entertainment. <b>I recognise that sounds get fainter as the distance from the sound source increases.</b></p>	<p>Which materials attract and which materials repel magnets? Can you predict what will happen if we put magnet poles together?</p> <p><b>I can observe how magnets attract or repel each other and attract some materials and not others. I know magnets have two poles. I can predict whether two magnets will attract or repel each other, depending on which poles are facing. I can compare how things move of different surfaces. I know that some forces need contact between two objects, but magnetic forces can act at a distance. I can 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.</b></p>	<p>What happens when materials change?</p> <p>I can compare and group materials together, according to whether they are solids, liquids or gases.</p>	<p>Who was Mary Anning? When did she live? Why was she important?</p> <p>I know that Mary Anning was a palaeontologist who made significant fossil finds on the southern coast of England. Who is Greta Thunberg? When did they live? Why were they important? I know who Greta Thunberg is. I know why she became famous I know how she campaigns to address climate change.</p>
	Did you know?	<p>I know that some people can't see well and wear glasses and that simple technology can help us see such as telescopes, binoculars etc.</p>	<p>I know that some people can't hear and that simple technology can help us hear (such as hearing aids and vibration alerts).</p>			<p>I can explore everyday materials and develop simple descriptions of the states of matter such as solids hold their shape, liquids form a pool not a pile, gases escape from a container.</p>	

		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD				
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People
YEAR 3	Skills	Make increasingly careful observations, identifying similarities, differences and changes, and making simple connections.	Make increasingly careful observations, identifying similarities, differences and changes, and making simple connections.	Make increasingly careful observations, identifying similarities, differences and changes, and making simple connections.	Take measurements in standard units, using a range of simple equipment.	Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy. Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams.	Ask questions about the world around them and explain that they can be answered in different ways.
	Practicals, Experiments and writing links	Explore how we see objects and how different levels of light and coloured light impact on perception (eg looking through blue coloured film to view food) Sort sources of light - natural and artificial, observe brightness and directionality. Determine how they are suitable for different purposes. Use binoculars, telescopes and microscopes to show how we use optical equipment to augment our perception of the world Research aids for the blind.	Investigate pitch using tighter/ slacker strings on stringed instruments. Investigate pitch using bottles with different amounts of water - small amount of water =lower pitch, fuller bottle gives higher pitch, using art straws of different lengths. Explore sound waves using a tuning fork. Draw conclusions from investigatory work. Write up to findings. Research aids for the deaf.	Identify electrical items which are powered in different ways and sort accordingly. Explain why each is powered in the way it is. Design a light for a particular purpose. Follow a circuit diagram and build a simple circuit. Investigate how to use switches to control a bulb and draw a simple circuit diagram.	Research uses for magnets and use magnets as a tool e.g. to play a fishing game, travel game, to sort small mixed objects, some of which are magnetic. Walk around school to find which materials are magnetic and which are not (Children record these in a diagram). Draw and label diagrams of magnets attracting & repelling objects. Investigate which types of metals are attracted by magnets. Using more than one magnet investigate the way in which like poles repel and opposite poles attract. Investigate magnetising chains of paper-clips ( a stronger magnet will magnetise more paper clips - link to strength of magnets).	Use a range of secondary resources to research the temperature in degrees Celsius (°C) at which materials change state (create bar charts to represent findings). Collect a range of materials (Ice, butter, wood etc.) and see which will begin to change state at room temperature.	
YEAR 4	Year 4 Knowledge	<p><b>TECHNOLOGY THAT HELPS US</b></p> <p><b>SUGGESTED TEXTS</b> Horrid Henry Rocks (Sound)</p> <p><b>SUGGESTED TRIPS</b> Think Tank - Birmingham Science Museum</p> <p>Why can we see things when there is a light source? In what environment can we see light the best? Why and how are shadows formed? How does an objects material characteristics effect the shadow it creates?</p> <p>I can describe how to find something when it is dark. I recognise humans cannot use their sense of sight in the dark state and that they can see things when there is some light.</p>	<p>How are sounds made? Are all sounds created in the same way? How can the volume of a sound be altered?</p> <p><b>I can explain how sounds are made, associating some of them with something vibrating. I can find patterns between the pitch of a sound and features of the object that produced it. I can find patterns between the volume of a sound and the strength of the vibrations that produced it. I know that sound waves from a sound source travel through a medium such as air or water to the ear.</b></p>	<p>How can we control the flow of electricity using switches? How do common conductors and insulators impact the flow of electricity? I know the sources of electricity.</p> <p><b>I can identify common appliances that run on electricity</b> and whether they are battery powered or mains powered. <b>I can construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. I can 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 know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. I can recognise some common conductors and insulators, and associate metals with being good conductors.</b></p>	<p>What is a friction? How does friction affect how things travel? What is air and resistance? What are the effects of up-thrust and down thrust?</p> <p>I know that friction is a force and I can describe the affects of friction in travel. I can compare how things move on different surfaces.</p>	<p>How can we group materials together?</p> <p><b>I can compare and group materials together, according to whether they are solids, liquids or gases. I can observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</b></p>	<p>Who was Sir Isaac Newton? When did he live? Who is an important scientist in this area and how did their ideas change scientific understanding?</p> <p>I know why Sir Isaac Newton was such an important scientist. I know that he made significant discoveries in the science of physics and that Newton's First Law explained gravity and impact of gravity on planetary motion, Who was Benjamin Franklin? When did he live? (1706-1770) Why was he important? I know that Benjamin Franklin was the first person to link electricity with lightening I know that he was instrumental in the development of battery to store electricity and can explain how this has impacted on our technology today.</p>
	Did you know?	I know that sources of light show up best at night-time eg bonfires, fireworks, candles. I know how the material an object is made from can affect the shadow it creates.			I can describe the effects of air resistance can describe how this affected the development of transport.		



		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD				
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People
YEAR 4	Skills	Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.	Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.	Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.	Take increasingly accurate measurements, in standard units, using a range of chosen equipment. Within a group, decide which observations to make, when and for how long, and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.	Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding. A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make.	Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.
	Practicals, Experiments and writing links	Use torches to explore a range of shadows made by different objects. Identify the differences in the shadows made by opaque, translucent and transparent objects. Test lights in different environments (dark, light, smoky). Test some sources of light in dark and light environments and discuss which environment shows the light more effectively.	Investigate how the force with which vibrations are created and the size of a sound box affects the volume of sounds created. Create a line graph to show the volume of sound (data logging).	Investigate a range of effective electrical conductors and insulators. Investigate how electrical conductors can complete a broken circuit. Design a circuit that meets specific criteria - e.g. a circuit with a buzzer and a switch for a blind person and explain why that would be appropriate for purpose. Write what happens when you change a circuit and why. Represent circuits created using accurate circuit diagram symbols.	Compare the effect different surfaces have on the speed of travel. Investigate how to increase/decrease friction Toy car Experiment. Investigate air resistance using parachutes and kites. Research how air resistance has influenced the development of different forms of transport e.g. Bullet trains etc. Write instructions for making a kite that will successfully fly.	Investigate the temperatures at which some everyday materials melt. (Chocolate, butter, wax, ice). Research materials that have higher melting points & watch videos e.g molten glass and metal. Investigate the effect of salt on the freezing point of water. Test the temperature of different materials when heated and cooled using a thermometer. Write about what happens to the thermometer when measuring heated objects vs. cooled.	
YEAR 5	Year 5 Knowledge	<p><b>PHYSICS IN THE HUMAN WORLD</b> This strand is about how humans hear and see linking the physics of light and sound with human biology?</p> <p><b>SUGGESTED TEXTS</b> Firework Makeer's Daughter (Light). George's Marvellous Medicine (Materials). Sound text link - Max and the millions Itch (changes of state)</p> <p><b>SUGGESTED TRIPS</b> Museum of technology and industry - Manchester</p>	<p>What are the main parts of the human eye? How do they help us to see? What types of technology help us see better and how do they work? I can name the main parts of the human eye and how it helps us to see.</p> <p>What is pitch? Why do sounds have a different pitch? How can pitch be changed? Why do sounds become louder or fainter? What are the main parts of the human ear and how do they help us to hear sounds?</p> <p>What types of technology help us to hear and how do they work?</p> <p>I know that sound can be augmented. I can name the main parts of the human ear and explain how it works.</p>	<p>Why do some circuits not work?</p> <p>I can explain and 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 can 'de-bug' a circuit.</p>	<p>How do pulleys levers and gears work?</p> <p><b>I can recognise that some mechanisms including pulleys, levers and gears allow a smaller force to have a greater effect. I can explain that unsupported objects fall towards the Earth because of the force of gravity, acting between the Earth and the falling object.</b></p> <p><b>I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</b></p>	<p>What materials dissolve in liquid? How do you get a substance from a solution? How are materials formed? What changes involving materials are reversible?</p> <p><b>I can 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. I know that some materials will dissolve in liquid to form a solution, and can describe how to recover a substance from a solution. I can use my knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. I can 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. I can give reasons based on evidence from comparative and fair test for the particular uses of everyday materials including metals, wood and plastic. I can demonstrate that dissolving, mixing and changes of state are reversible changes.</b></p>	<p>Who was Ibn al-Haytham? When did he live? - 965 - 1040 (Muslim) How did his ideas change scientific understanding?</p> <p>I know the he was father of modern optics, I can explain how he developed understanding of how light travels from sun and how the eye sees. Who was an important scientist in this area and how did his ideas develop the understanding of biology? How did Charles Darwin change understanding of biology? I know who Charles Darwin was. I know when he was alive and why his ideas caused controversy. I can name his most famous publication. I can explain his ideas about evolution.</p>

		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD					
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People	
YEAR 5	Did you know?		I know different types of technology that help us to see better and can begin to describe how they work.	I can begin to describe the types of technology that can help humans to hear.				
	Skills		Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models).	Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	Within a group, decide which observations to make, when and for how long, and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect. Take increasingly accurate measurements, in standard units, using a range of chosen equipment. Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.	
	Practicals, Experiments and writing links		Use string to show how light is reflected from objects and into our eyes. Use pinhole cameras to observe how light passes and the image is inverted. Using black out glasses/goggles - investigate how loss of sight or impaired sight can effect daily life/tasks Eye dissection.	Make parts of the ear in groups using different materials eg white sheet for ear drum, and re-enact the movement of a sound wave through the parts of the ear. Using ear muffs - investigate how loss of hearing or impaired hearing can effect daily life/tasks Does the object/material impact on the pitch of the sound created?	Investigate why some circuits are not complete and why a lamp will not light. Find ways in which they can 'de-bug' a circuit so it works.	Make a pulley/lever LINK to DT.	Sieving & filtering, dissolving and saturated solutions, irreversible changes.	
YEAR 6	Year 6 Knowledge	APPLICATION  SUGGESTED TEXTS The Tin Snail (forces and mechanisms, Goodnight Mr Tom (electricity). Kensuke's Kingdom (explore properties of materials)  SUGGESTED TRIPS Museum of technology and industry - Manchester	How does light travel?  <b>I recognise that light appears to travel in straight lines</b> and can use my knowledge of how light appears to travel in straight lines to describe and explain how a periscope works. <b>I 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. I use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. I know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</b>	Does sound travel through a variety of materials? Are there any situations in which sound can not travel?  I know that the materials a sound passes through affect the quality of the sound.	How do we represent circuits in a recorded diagram?  <b>I associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit. I can 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.</b> I know how to change the output of various components. <b>I use recognised symbols to represent a simple circuit as a diagram.</b>	What are the effects of forces on mechanical systems?  I can apply my knowledge of mechanical systems and forces to influence their effects and the outcome.	How can I separate materials?  I know that evaporation and condensation can be used to separate materials. I can explain whether these changes are reversible or irreversible.	Who first thought that sound travelled in waves and how has this knowledge changed the modern world? Who was Aristotle? When did they live? Why were they important? What is the impact of their work? Who was Thomas Edison? When did he live? Why was he important?  I know that Aristotle (384-322 BC) discovered that sound travels in waves. I know that Thomas Edison(1847-1931) recording sound for the first time and can explain how this impacts on our lives today. Who was Vera Rubin? When was she alive? ( 1928-2016) How did she advance scientific understanding? I know that Vera Rubin was American (Jewish immigrant) and that she won the Nobel Prize for discovering evidence for dark matter, predicted the angular motion of galaxies,
	Did you know?		I can describe how light behaves in convex and concave lens. I can describe how light behaves in water and understand this is a form of refraction.	I know that sound can not travel in a vacuum.				

		TOPICS	TECHNOLOGY AND THE PHYSICAL WORLD				
SCIENCE UNIT		Light	Sound	Electricity	Forces	Materials	Significant People
YEAR 6	Skills	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.	Independently, decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify links between cause and effect. Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.	Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding. A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. Independently, decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.	Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding. A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. Independently, decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.	Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.
	Practicals, Experiments and writing links	How does the appearance of objects in water change? Does the vessel for the water alter perception? Why? Make a periscope - investigate using mirrors around a corner, above a table etc Investigate light refraction with concave and convex lenses - draw diagrams of the effect of different shaped prisms on the light source. Instructions for making a periscope.	Sound insulation investigation -comparing insulating properties of different materials - using buzzers. Do effective sound insulators also insulate light?	Compare bulb brightness in series and parallel circuits. Make and draw diagrams of circuits using the correct symbols.	Forces investigation - combining knowledge of pulleys, gears magnets to create a lifting machine - which can lift the heaviest weight?	Retrieve salt from a solution - observe changes in the solution over time noting formation of crystals. Use hot water and a vessel containing ice to create condensation. Explanation of the processes of evaporation and condensation.	