



# Science

## INTENT, IMPLEMENTATION, IMPACT

<p><b>Year 3</b></p> <p>Rocks</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"><li>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li><li>describe in simple terms how fossils are formed when things that have lived are trapped within rock</li><li>recognise that soils are made from rocks and organic matter</li></ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"><li>Fair testing - Test the hardness of different rocks.</li><li>Pattern seeking - What happens when different rocks are put in water.</li><li>Pattern seeking/fair testing - How quickly water runs through different types of soil?</li></ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"><li>How do the properties of a rock affect its use?</li><li>How are different rocks formed?</li><li>What are the different properties of rocks?</li><li>How are fossils formed?</li><li>How does the composition of soil affect its permeability?</li><li>What is soil and how is it made?<ul style="list-style-type: none"><li>Why are different rocks suited for different purposes?</li></ul></li></ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"><li>Rock hunt around the school - Classifying different rocks.</li><li>Comparing and grouping together different kinds of rocks on the basis of their appearance and simple physical properties.</li><li>Testing different soils for water absorption</li><li>Researching the work of Mary Anning</li><li>-</li></ul> <p>Learning Journey:</p> <ul style="list-style-type: none"><li>Science Y6 – Evolution</li><li>Science Y2 - Materials</li></ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"><li>There are different types of rock.</li><li>Name the 3 main types of rocks (sedimentary, igneous and metamorphic) and some of their identifiable properties.</li><li>Palaeontologists use Fossils to find out about the past.</li><li>Fossils provide evidence that living things have changed over time.</li><li>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</li><li>Recognise that soils are made from rocks and organic matter</li></ul> <p>Beyond living memory... Mary Anning (1799 - 1847) (Class reader)</p> <p>Within living memory... Sanjeev Gupta (1971 - present)</p> <p>Key vocabulary:</p> <p>Tier 2: rock, material, Earth, remains, heat, pressure, durable, preserve, decay, earthworm, leaves, soil</p>
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<p>Forces and magnets</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>• Compare how things move on different surfaces</li> <li>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>• Observe how magnets attract or repel each other and attract some materials and not others</li> <li>• 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</li> <li>• Describe magnets as having two poles</li> <li>• Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>-Fair testing: test how objects move on different surfaces</li> <li>- Pattern seeking - Does the size and strength of a magnet affect how strong it is?</li> </ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>• What effect do different surfaces have on the distance that a toy car will travel?</li> <li>• What materials are magnetic?</li> <li>• What are the poles of a magnet and how do they behave?</li> <li>• Does the size of a magnet affect how strong it is?</li> <li>• Do all magnets have the same strength?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>- Test how objects move on different surfaces</li> <li>- Investigating which types of materials are magnetic by grouping and comparing</li> <li>- Testing strength of magnets - Does the size and strength of a magnet affect how strong it is?</li> </ul> <p>Learning Journey:</p> <ul style="list-style-type: none"> <li>- Science Y5- Properties of materials, forces</li> </ul> <p>Visits:</p> <ul style="list-style-type: none"> <li>-The science Museum</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>- Sort and classify materials into magnetic and not magnetic.</li> <li>- All magnetic materials are made of metal</li> <li>- Iron, steel, nickel and cobalt are key magnetic metals</li> <li>- Aluminium, copper and gold are not magnetic</li> <li>- Steel contains iron, which is why steel is magnetic</li> <li>- Magnetism is a force that pushes and pulls</li> <li>- Name the two poles of a magnet.</li> <li>- Know that magnets will attract and repel each other when poles are facing.</li> <li>- Explain what a force is.</li> </ul> <p>Beyond living memory... Leonardo Da Vinci (1452-1519)</p> <p>Within living memory... Masato Sagawa (1943-)</p> <p>Key vocabulary:</p> <p>Tier 2: push, pull, surface, movement, magnet, attract, repel, north/south pole, metal, iron, steel, nickel</p> <p>Tier 3: contact/non-contact force, friction, resistance, gravity, magnetic field, magnetism, horseshoe/bar/ring magnet</p>
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<p>Animals including humans</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>- Pattern seeking - Do 'healthy' drinks have less sugar?</li> <li>- Research - Look at food packaging to identify the amount of nutrients in different drink items.</li> <li>- How can we keep our pets healthy?</li> </ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>• What are the 5 main food groups?</li> <li>• Which drink is the healthiest choice based on sugar content?</li> <li>• Why do humans need a skeleton (functions)?</li> <li>• What are the different skeleton types?</li> <li>• How do joints help us to move?</li> <li>• What role do muscles play in our bodies?</li> <li>• Do people who do more physical activity have stronger muscles?</li> <li>• Why do we need muscles and how do they work?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>• Creating a balanced meal for a human</li> <li>• Investigate the amount of sugar in different drinks (using scales)</li> <li>• Creating a model of and labelling a skeleton</li> <li>• Classifying animals according to their skeleton type</li> <li>• Identify the joints being used during different movements</li> <li>• Circuit activity – activating and identifying each muscle group</li> </ul> <p>Learning Journey:</p> <ul style="list-style-type: none"> <li>- Science Y1 and 2 – Animals including humans – food</li> <li>- Science Y4 – digestive system</li> <li>Science Y6 – Circulatory system</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>• Different animals are adapted to eat different foods.</li> <li>• Understand that many animals have skeletons to support their bodies and protect vital organs.</li> <li>• Name different parts of a skeleton eg skull</li> <li>• Muscles are connected to bones and move them when they contract.</li> <li>• Movable joints connect bones</li> <li>• Explain how much of each of the 5 food groups we should be consuming for a balanced meal</li> </ul> <p>Beyond living memory... Louis Pasteur (1822-1895)</p> <p>Within living memory... Charlotte Armah (1970-present)</p> <p>Key vocabulary:</p> <p>Tier 2: growth, carbohydrate, fat, protein, dairy, domestic, pet, environment, diet, behaviour, company, health and welfare, skeleton, skull, ribcage, spine, muscle, relax, contract</p> <p>Tier 3: nutrition, energy, calcium, joints, organs, triceps, bicep</p>
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<p>Plants</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>• 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</li> <li>• investigate the way in which water is transported within plants</li> <li>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul> <p><b>Working Scientifically Focus:</b>  - Observing over time - Observe celery (with roots and leaves) in coloured water. Observe white carnations (freshly cut) in coloured water. - Pattern seeking - Investigate what happens when conditions are changed e.g. more/less light/water, change in temperature, nutrients.  - Research - What are the ways that seeds disperse?</p>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>• What are the functions of different parts of the plant?</li> <li>• How is water transported within a plant?</li> <li>• What do plants need to grow?</li> <li>• What role do flowers play in pollination?</li> <li>• How do plants make food and how is water transported?</li> <li>• How do plants spread their seeds?</li> <li>• What do seeds need to germinate?</li> <li>• Why does a plant need flowers?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- Using food colouring to show how water is transported through celery</li> <li>- Observe plants to label key features</li> <li>- Research and view different seeds and describe how they are dispersed</li> </ul> <p><b>Learning Journey:</b></p> <ul style="list-style-type: none"> <li>- Science Y1, 2 and 5 – plants</li> </ul> <p><b>Visits:</b>  Local trip to Wandle Park/river  Compare Sensory Garden from winter to summer</p>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>• Plants are producers, they make their own food.</li> <li>• Label the roots, stem/trunk, leaves and flowers on a plant and explain their function</li> <li>• That water and nutrients are taken from the soil through the roots and stem</li> <li>• Their leaves absorb sunlight and carbon dioxide</li> <li>• Plants have roots, which provide support and draw water from the soil</li> <li>• Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production</li> <li>• Seed dispersal improves a plants chances of successful reproduction</li> <li>• Seeds/bulbs require the right conditions to germinate and grow.</li> <li>• Seeds can be dispersed in many ways eg wind, animals</li> <li>•</li> </ul> <p><b>Beyond living memory...</b> George W. Carver (1864 - 1943)  <b>Within living memory...</b> Luciano Scandian (unknown - present)</p> <p><b>Key vocabulary:</b></p>
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			<p>Tier 2: seed, parent plant, roots, stem, leaves, trunk/branches, flowers, transport, absorb, tubes, flower, pollen, nectar, attract</p> <p>Tier 3: dispersal, germination, root hair, function, nutrients, carbon dioxide, growth rate, nutrient, drought, climate, pollination, reproduce</p>
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<p>Light</p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• recognise that they need light in order to see things and that dark is the absence of light</li> <li>• notice that light is reflected from surfaces</li> <li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>• find patterns in the way that the size of shadows change.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>• Pattern seeking - How a shadow changes size depending on the distance of the light source from the object.</li> <li>• Classify materials according to whether they are a light source or not, how much light they let through and how reflective they are.</li> <li>• Recording findings of transparent/ translucent/ opaque objects on Venn diagram.</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>• What are light sources?</li> <li>• What are reflective materials?</li> <li>• How are shadows formed?</li> <li>• How does light behave when it is reflected?</li> <li>• Can we change how shadows are formed?</li> <li>• How can we protect our eyes from the sun?</li> <li>• Do shadows stay the same all day?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>• Classifying light sources</li> <li>• Measuring the size of a shadow as the distance from a light source changes.</li> <li>• Classifying materials on the basis of translucent, transparent, opaque with use of data loggers.</li> <li>• Creating an infographic for keeping eyes safe in the sun.</li> </ul> <p><b>Learning journey:</b></p> <ul style="list-style-type: none"> <li>• Science Y6 - Light</li> <li>• Science Y5 - Earth and space</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>• There must be light for us to see. Without light it is dark.</li> <li>• Know that we need light to see things even shiny things.</li> <li>• Explain that transparent materials let light through them and opaque materials don't let light through.</li> <li>• Know that beams of light bounce off some materials (reflection).</li> <li>• Name a variety of light sources eg sun, torch and candle</li> <li>• Explain ways in which we can protect ourselves from the sun.</li> <li>• Understand that shadows are formed by blocking the light from a light source.</li> <li>•</li> </ul> <p><b>Beyond living memory...</b> Thomas Edison (1847 - 1931)</p> <p><b>Within living memory...</b> Isamu Akasaki (1929 - 2021)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> light, reflect, visible, visibility, dark, shiny, bright, dull, matt, mirror, angle, shadows, position, direction, damage, protection, sunrise, sunset, rotation, compass direction,</p> <p><b>Tier 3:</b></p>
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			light source, opaque, translucent, transparent, filters, UV rays, retina, pupil
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<p><b>Year 4</b></p> <p><b>Electricity</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Know the difference between renewable and non-renewable energy sources and benefits and sustainability of each.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>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.</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>Recognise some common conductors and insulators, and associate metals with being good conductors.</li> <li>Learn about hazards associated with electricity.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>Classifying - Based on the children's own criteria, classify household appliances and/or toys (leading to electrical/not electrical, batteries/mains).</li> </ul>	<p><b>Investigation questions:</b></p> <p>What is electricity and where does it come from?          What are electrical appliances and how can we use them? How can electricity be dangerous?          How can we keep ourselves safe around electricity?          How do you make a complete electrical circuit?          Which materials allow electricity to flow through them?          How do switches affect a circuit?          Why are switches important? Who was Thomas Edison and how did he develop the use of the electricity?</p> <p>Classify sources of electricity into renewable and non-renewable sources. Classify appliances into mains and battery usage          Design a poster warning people of the hazards of electricity Making a light bulb light up without any input. Create the circuits in the pictures and test to see if they are complete or incomplete.          Testing different materials to see whether they are insulators and conductors          Making and testing own switches</p>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>Understand that a source of electricity (mains or battery) is needed for electrical devices to work.</li> <li>Electricity sources push electricity round a circuit.</li> <li>Know that more batteries will push the electricity round the circuit faster.</li> <li>Explain that a complete circuit is needed for electricity to flow and devices to work.</li> <li>Name and identify different parts of a circuit eg bulb, wires, cell/battery, motor, buzzer</li> <li>Understand that some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.</li> </ul> <p><b>Beyond living memory...</b> Benjamin Franklin (1706-1790)          Lewis Latimer Howard (Class reader)  <b>Within living memory...</b> Erik Bystrup (unknown-present)</p>
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	<ul style="list-style-type: none"><li>- Test materials to classify into insulators and conductors – children work out how to test them.</li><li>- Make predictions as to whether objects are insulators or conductors.</li><li>- Analyse results – create own switches and conclude their suitability.</li><li>- Research – Lewis Latimer Howard</li></ul>	<p><b>Learning Journey:</b></p> <ul style="list-style-type: none"><li>- Science Y5 – Materials</li><li>- Science Y6 – Electricity</li><li>- Renewable energy</li><li>- DT Y4 – Torches/ Light Houses</li><li>- Science Y2 - Materials</li></ul> <p><b>Trips:</b> The Science Museum</p>	<p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> appliance, mains electricity, battery, generated, power station, electrical energy, pylon, plug, socket</p> <p><b>Tier 3:</b> convert, series circuit, component, bulb (lamp), lamp holder, buzzer, cell, battery, wire, crocodile clip, electrical conductor, electrical</p>
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<p style="text-align: center;"><b>Sound</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>Identify sounds around them and how they are made,</li> <li>Discuss vibrations.</li> <li>Recognise that vibrations from sounds travel through a medium to the ear.</li> <li>Find patterns between the pitch of a sound and features of the object that produced it.</li> <li>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>Recognise that sounds get fainter as the distance from the sound source increases.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>Pattern seeking - Is there a link between volume and distance?</li> <li>Fair testing – measure volume when changing distance/adding a sound proof material</li> </ul>	<p><b>Investigation questions:</b></p> <p>How are the sounds made and travel?  How does distance affect how well we hear a sound? Which sounds can we hear from furthest away?  What materials block (absorbs) the most sound?  How do you change the pitch of an instrument?  What happens to sound as the distance from the sound source increases?  How do the features of an object affect the pitch of the sound it makes?  What material provides the best insulation against sound? How do the features of an object affect the pitch of the sound it makes?</p> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>Sort out the pictures and descriptions on a flow map to explain how we hear things.</li> <li>Placing a tuning fork in water to demonstrate how sound travels</li> <li>Create a string telephone to test how sound travels</li> <li>Make straw pipes to explore pitch</li> <li>Use a data logger to measure the volume of the alarm sound when they are 1m, 2m away and so on until the sound is inaudible.</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>Sound spreads out as it travels.</li> <li>Sound is produced when an object vibrates.</li> <li>Sound moves through all materials by making them vibrate.</li> <li>Sound travels in waves.</li> <li>Know that pitch is to do with how high or low a sound is.</li> <li>Explain how the volume of a sounds can be changed and the volume is linked to vibrations.</li> <li>Name materials which are good for sound proofing.</li> </ul> <p><b>Beyond living memory...</b> Alexander Graham Bell (1847-1922)  <b>Within living memory...</b> Jaap Haartsen (1963 - present)</p> <p><b>Key vocabulary:</b>  <b>Tier 2:</b> sound, vibrate/ vibrations, medium, volume, distance, decrease, insulation  <b>Tier 3:</b> energy, sound wave, sound source, insulator, pitch</p>
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	<ul style="list-style-type: none"> <li>• Using data loggers to record volume compared to distance from source</li> <li>• Drawing conclusions and presenting results of sound proofing investigation on a bar chart.</li> <li>• Set up simple practical enquires to answer the questions. Report on findings from enquires including oral and written explanations.</li> <li>• Take accurate measurements using the data logger.</li> <li>• Draw simple conclusions using data logger results.</li> </ul>	<ul style="list-style-type: none"> <li>• Create a bar chart to show results of sound proofing investigation</li> <li>• Conduct an investigation to test different materials to see which will be the best to insulate sound.</li> </ul> <p><b>Learning journey:</b></p> <ul style="list-style-type: none"> <li>-Music – instruments</li> <li>- Science Y4 – States of matter</li> </ul> <p><b>Trips:</b></p> <p>Minster church (organ/acoustics)</p>	
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<p><b>States of matter</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>- Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>- Look at particles in these states in detail.</li> <li>- 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)</li> <li>- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>- Identifying and classifying - Can you group these materials and objects into solids, liquids and gases?</li> <li>- Observing – Water cycle bag weekly to see evaporation/condensation taking place. – Observe water changing state.</li> <li>- Fair testing – whether chocolate will melt faster when the temp of water is changed?</li> <li>- Concluding – drawing conclusions based on chocolate melting investigation</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>– What is matter? What are the differences between solid, liquid and gases?</li> <li>– How do solids, liquid and gases change state?</li> <li>– What states can water be in?</li> <li>– How can water change?</li> <li>– What is the water cycle and how many stages are there?</li> <li>– What are the 4 stages of the water cycle? What types of precipitation are there?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- Act as particles in a solid, liquid and gas to show understanding of their bonds.</li> <li>- Classify objects into either solid, liquid or gas and explain how you know.</li> <li>- Use thermometers to measure water temperature when investigating the impact of temperature on melting.</li> <li>- Investigate how water changes state by making observations</li> <li>- Water cycle bags on the window to observe the different stages.</li> </ul> <p><b>Learning journey:</b></p> <ul style="list-style-type: none"> <li>- Geography Y4 – Rivers</li> <li>- Science Y4 - Sound</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>• Materials can be divided into solids, liquids and gases.</li> <li>• Explain how the particles in solids, liquids and gases are arranged.</li> <li>• Know that heating causes solids to melt into liquids and liquids evaporate into gases.</li> <li>• Know that cooling causes gases to condense into liquids and liquids to freeze into solids.</li> <li>• Name the 3 states that water can be in – solid (ice), liquid (water) and gas (water vapour/steam).</li> <li>• Outline the 4 main stages of the water cycle</li> </ul> <p><b>Beyond living memory...</b> Anders Celsius (1707 - 1744)</p> <p><b>Within living memory...</b> Heston Blumenthal (1966 - present)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> melt, temperature, freeze, melt</p> <p><b>Tier 3:</b> states of matter, solid, liquid, gas, matter, mass, volume, particles, properties, water vapour, melting point, freezing point, condensation, evaporation, water cycle, precipitation, water vapour</p>
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		<ul style="list-style-type: none"><li>- Science Y5 – Properties of materials</li><li>- Science Y6-light</li><li>-</li></ul> <p>Visits: Local trip to Wandle Park/river</p>	
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<p><b>Animals including humans</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>Identify the different types of teeth in humans and their simple functions</li> <li>Learn about tooth decay</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>Observing over time - How does an egg shell change when it is left in different liquids?</li> <li>Setting up a simple fair test</li> <li>Predictions – which egg will be most damaged and why?</li> <li>Conclusions – why were the eggs damaged in different ways?</li> <li>I can identify similarities and differences related to scientific ideas.</li> <li>Plan and carry a fair test.</li> <li>Distinguish between scientific and non-scientific evidence when answering questions.</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>How many different types of teeth do we have and what are their jobs?</li> <li>Do all animals have the same type of teeth and why?</li> <li>Why is it important to look after our teeth?</li> <li>What is the digestive system and why is it important?</li> <li>What do the different parts of the digestive system do?</li> <li>What are food chains?</li> <li>What are food webs?</li> <li>What was unusual about George Washington’s teeth?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>Label a diagram of the digestive system and explain some of its key functions.</li> <li>Cut and stick different teeth and label them</li> <li>Carry out an investigation using eggs to look at the impact of different liquids on tooth decay</li> <li>Observing an egg with coke, water and orange as a model for tooth decay.</li> <li>Draw parts of the digestive system onto the outline of the human body using the pictures on the board and label them.</li> <li>Creating a model of digestive system using tights and biscuits.</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>Explain that animals have teeth to help them eat.</li> <li>Name different types of teeth and their different jobs.</li> <li>Know that food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood.</li> <li>Understand that the blood takes nutrients around the body.</li> <li>List ways in which to keep our teeth healthy and decay free.</li> <li>Draw a simple food chain and explain each component's role within it.</li> </ul> <p><b>Beyond living memory...</b> Pierre Fauchard (1679 - 1761)</p> <p><b>Within living memory...</b> Zhaoming Liu (unknown - present)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> teeth, digestive system, mouth, tongue, stomach, adaptation, energy, prey, predator</p> <p><b>Tier 3:</b> incisor, canine, molar, premolar, carnivore, omnivore, herbivore, oesophagus, small and large intestine, food chain, producer, primary/secondary/tertiary consumer</p>
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		<ul style="list-style-type: none"><li>- Sorting animals into habitats and answer questions on food chains.</li><li>- Create a variety of food chains using pictures and research different food chains.</li><li>- Fill in missing animals from the food web</li><li>- Read 'Demon Dentist' by D Walliams (class reader)</li></ul> <p>Learning Journey:</p> <ul style="list-style-type: none"><li>- Science Y2 – Food chains</li><li>• Science Y6 - Diet and exercise and circulatory system</li><li>• Science Y3 – nutrition</li></ul>	
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<p><b>Living things and their habitats</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• Recognise that living things can be grouped in a variety of ways</li> <li>• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>• Learn about invertebrates and vertebrates.</li> <li>• Recognise that environments can change and that this can sometimes pose dangers to living things</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>• Identification and classification - pupils classify living things around the school and in another environment (local parks)</li> <li>• Research environmental challenges.</li> <li>• Record, classify and present data in a variety of ways to help answer questions. Use a range of methods to sort and group living things.</li> </ul>	<p><b>Investigation questions:</b></p> <p>How do we group living things? What are the characteristics of vertebrates and invertebrates?  How can we group and classify plants?  What are invertebrates and how can they be classified?  How do I create my own classification key?  How can local habitats be threatened?  How can environments change and what impact does this have on endangered species?  What species are endangered/ extinct and why? How does conservation help?  How can we develop the local area to protect living things? What dangers are posed to habitats and the environment?  What is special about our local area?</p> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- Create a poster to explain what processes a living thing must have.</li> <li>- Match the vertebrate photo cards to the correct group.</li> <li>- Identify plants around the school and the group that they fit into.</li> <li>- Use a classification key to sort invertebrates.</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>• Group and sort living things into groups based upon their characteristics</li> <li>• Know the difference between a vertebrate and an invertebrate and name animals which could fit into each group.</li> <li>• Name endangered and extinct species and have knowledge of ways in which we can help these.</li> <li>• Explain how human activity significantly affects the environment</li> </ul> <p><b>Beyond living memory...</b> Carl Linnaeus (1707 - 1778)  <b>Within living memory...</b> Vanessa Nakate (1996 - present)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> group, category, key, flowering, non-flowering, environment, surroundings, conditions, natural, human-made, endangered, extinct, positive, negative, indifferent, protect, manage, impact</p> <p><b>Tier 3:</b> classification, vertebrate, invertebrate, spores, dichotomous key, urbanisation, deforestation, pollution, climate change, population, fossil fuels, natural disaster, human impact, Venn diagram, conservation</p>
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	<ul style="list-style-type: none"> <li>• I can generate questions about animals. I can use questions to sort animals in a key.</li> <li>• I can group and classify plants and flowers. I can ask and answer scientific questions.</li> <li>• I can create a key to classify invertebrates.</li> <li>• I can group and classify a range of different living things.</li> <li>• I can create a classification key.</li> <li>• I can ask scientific questions and conduct research.</li> </ul>	<ul style="list-style-type: none"> <li>- Arrange living things into classification keys by choosing questions that let split each group into two.</li> <li>- Draw a local habitat then draw and label any environmental threats and dangers to living things.</li> <li>- Research an endangered animal and present findings to the class.</li> <li>- Children create a classification key in pairs on sugar paper</li> <li>- Pupils go on a wildlife hunt around school and classify animals using a classification key</li> </ul> <p><b>Learning journey:</b></p> <ul style="list-style-type: none"> <li>- Air pollution –Eco council</li> <li>- Science Y6- classification</li> <li>- PSHE (all years) - caring for our environment.</li> <li>- Sensory garden- sustainability</li> </ul> <p><b>Visits:</b> Morden Hall or Painshill Park - pond dipping</p>	
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<p><b>Year 5</b></p> <p>Properties and Changes of Materials</p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated,</li> </ul>	<p><b>Investigation questions:</b></p> <p>What are the different properties of different materials?          Which material is the best thermal insulator?          Which materials are electrical conductors?          What paper is most suited for a food take away bag?          Which materials are good at absorbing?          What have I learnt this half term on materials and their properties?          Which changes are reversible? What items do you predict are dissolvable?          When we change a material, is it always forever?          Which material would be best to keep an ice lolly cold?</p>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>• When two or more substances are mixed and remain present the mixture can be separated.</li> <li>• Some changes can be reversed and some can't.</li> <li>• Materials change state by heating and cooling.</li> <li>• Choose correct equipment to separate a mixture.</li> <li>• Choose a material for a specific purpose.</li> </ul>
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<p><b>Year 5</b></p> <p>Properties and Changes of Materials</p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>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</li> <li>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution <ul style="list-style-type: none"> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> </ul> </li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>Writing a conclusion to explain what they notice about properties of materials.</li> <li>Comparative testing – how</li> </ul>	<p><b>Investigation questions:</b></p> <p>What are the different properties of different materials?  Which material is the best thermal insulator?  Which materials are electrical conductors?  What paper is most suited for a food take away bag?  Which materials are good at absorbing?  What have I learnt this half term on materials and their properties?  Which changes are reversible? What items do you predict are dissolvable?  When we change a material, is it always forever?  Which material would be best to keep an ice lolly cold?  What methods can we use to separate materials?  What did Spencer Silver discover?</p> <p><b>Key activities in the unit of work are:</b></p> <p>Describing materials  Comparing everyday materials based on evidence and comparative fair tests  Plan, conduct and record findings of an investigation on the thermal insulation.  Play a game to identify electrical conductors and insulators and present findings to the class.  Test different papers to identify strongest.  Plan and carry out an investigation on a range of papers that explores their strength. Make a paper bag. Testing which material is most absorbent.</p>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>When two or more substances are mixed and remain present the mixture can be separated.</li> <li>Some changes can be reversed and some can't.</li> <li>Materials change state by heating and cooling.</li> <li>Choose correct equipment to separate a mixture.</li> <li>Choose a material for a specific purpose.</li> <li>Explain why some changes are irreversible.</li> <li>Explain the process of dissolving</li> </ul> <p><b>Beyond living memory...</b> Albert Einstein (1879 – 1955)  Spencer Silver (1941-2021)  <b>Within living memory...</b> Hugh Bradner (1915 - 2008)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2:</b> material, mixture, burning, rust  <b>Tier 3:</b> thermal, conductor, insulator, transference, independent/dependent/controlled variable, dissolve, solid, liquid, gas, states of matter, solution, filtration, sieving, evaporation, permeable, vapour, particles, irreversible, chemical changes, acid</p>
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	<p>hard, magnetic, flexible, transparent and permeable materials are.</p> <ul style="list-style-type: none"> <li>• Planning own investigation in how to test the materials.</li> <li>• Classify materials into thermal insulators and conductors</li> <li>• Measuring results accurately using a thermometer</li> <li>• Presenting results by making a presentation.</li> <li>• Predicting – which materials will be the best conductors and which materials will dissolve in water.</li> <li>• Fair testing – paper strengths</li> <li>• Observing – reversible and irreversible changes</li> <li>• Draw a detailed method of how to separate mixtures.</li> <li>• identify scientific evidence that has been used to support or refute ideas or arguments</li> <li>•</li> </ul>	<p>Evaluation and reflections: what have we learnt about materials and their properties from these investigations. Sorting chemical and physical changes into reversible and irreversible changes Test materials in water to see if they are dissolvable Separating sand and water Stick in a post it note using Spencer Silver's Glue</p> <p>Learning journey:</p> <ul style="list-style-type: none"> <li>- Science Y1 – Material properties</li> <li>- Science Y2 – Material uses</li> <li>- Science Y3 – Magnets</li> <li>- Science Y4 – insulators and conductors</li> <li>- Science Y4 – States of matter</li> <li>- Science Y6 – Light - Sustainable fashion Sustainability week</li> </ul>	
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<p>Living things and their habitats</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>Describe the life process of reproduction in some plants and animals.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>Observing – dissect a plant to observe the parts in close detail</li> <li>Observing overtime – asexual reproduction of a potato</li> <li>Draw a scientific diagram of a flower and label with correct vocabulary</li> <li>Research using secondary resources to create fact files and life cycle wheels.</li> </ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>What are the reproductive parts of a flower and what do they do?</li> <li>Can I identify the parts of a flower?</li> <li>What is the process of reproduction in some plants?</li> <li>What are the differences between the life cycles of amphibians and insects?</li> <li>What are the differences between the life cycles of mammals and birds?</li> <li>Can I explain why chimpanzees are endangered and describe Jane Goodall's work?</li> <li>What are the stages of human development?</li> <li>Are there any differences between the lifecycles of mammals, amphibians, insects and birds?</li> <li>Do all animals reproduce in the same way?</li> <li>What is sexual reproduction in plants?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>Complete definitions of parts of a flower then label a diagram of a flower</li> <li>Dissect a flowering plant to focus closely on reproductive parts of the flower</li> <li>To grow a potato from a potato and analyse over time.</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>Name and label the reproductive parts of a plant and explain their functions.</li> <li>Explain the life cycle of a bird.</li> <li>Explain the life cycle of a mammal.</li> <li>Explain the life cycle of a mosquito.</li> <li>Explain the lifecycle of a salamander.</li> <li>Know the stages of a human life cycle.</li> </ul> <p>Beyond living memory... Gregor Mendel (1822 - 1884)</p> <p>Within living memory... Jane Goodall (1934 - present)</p> <p>Key vocabulary:</p> <p>Tier 2: lifecycle, natural world, expertise, observe, document, study</p> <p>Tier 3: stages of development, sexual, asexual, reproduction, larvae, embryo, metamorphosis, naturalist, sexual/ asexual reproduction, pistal/carpel, stigma, style, ovary, stamen, anther, nectar, pollen, pollination, fertilisation, dispersal, tuber, bulb, runner, clone, vegetative propagation, sperm, egg, external/internal fertilisation</p>
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		<ul style="list-style-type: none"><li>- Compare the life cycle of a mosquito (insect) and a salamander (amphibian)</li><li>- Create a life cycle wheel. Make two to compare lifecycles</li><li>- Create a fact file about chimpanzees</li><li>- Create and illustrate personal human life cycle</li></ul> <p>Learning journey:</p> <ul style="list-style-type: none"><li>- Science Y2 – Life cycles</li><li>- Science Y2 - Plants</li><li>- Science Y3 – Plants</li><li>- Science Y5 – Animals inc humans</li></ul> <p>Trips:</p> <p>Compare Sensory Garden from winter to summer</p> <p>Wandle Park visits</p>	
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<p>Animals including humans</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>Describe the changes as humans develop to old age.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>Pattern seeking between animals and gestation periods</li> <li>Recording gestation periods in a bar chart</li> </ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>What are the stages of Human Development?</li> <li>What can the size of animals incl. humans tell us about gestation periods?</li> <li>How can we investigate changes as we progress through the lifecycle?</li> <li>How does a human foetus develop?</li> <li>How does a human develop from baby to child?</li> <li>How does a human develop from adolescent to adult?</li> <li>How does a human change from adult to old age?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>Create a flow map to show the different stages of a human life cycle</li> <li>Compare gestation periods of animals and display in a bar chart summarise the different stages of foetal development with size references</li> <li>show and describe the changes a human goes through from infant stage to child</li> <li>describe how the male and female body changes through puberty</li> <li>compare old age between different populations across the world e.g. U.K to Japan</li> </ul> <p>Learning journey:</p> <ul style="list-style-type: none"> <li>Science Y5 – Living things</li> <li>PSHE/RSE – Y5 and Y6</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>Know that different people mature at different rates and live to different ages.</li> <li>Understand that puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction</li> <li>Name the stages of a human life cycle</li> <li>Describe the changes that take place during a humans' life</li> </ul> <p>Beyond living memory... Alexander Fleming (1881 - 1955)</p> <p>Within living memory... Rosalind Franklin (1920 - 1958)</p> <p>Key vocabulary:</p> <p>Tier 2 toddler, stages, lifecycle, puberty, pubic hair, breasts, periods, womb, chemical, mass</p> <p>Tier 3: embryo, foetus, adolescent, hormones, genes, DNA, oestrogen, testosterone, pituitary gland, reproduction, menstruation, gestation period, viviparous, zygote</p>
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<p>Earth and space</p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>• Describe the movement of the Moon relative to the Earth</li> <li>• Describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>• identify scientific evidence which does or does not provide evidence for an idea or argument.</li> <li>• Scientific explanations – why we have night and day and explain the movement of the moon using models</li> <li>• Research – Different planets</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>• What shape is the earth and how do we know?</li> <li>• What are the names of the planets in our solar system and what are they like?</li> <li>• How do the planets in our solar system move?</li> <li>• How do Day and Night occur</li> <li>• What time is Day and Night for different locations around earth?</li> <li>• What are the movements of the moon?</li> <li>• What is the life cycle of a star?</li> <li>• What is the Goldilocks' principle?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- state from evidence why the earth is a sphere</li> <li>- Making a fact file for each planet as part of Home learning</li> <li>- Creating a short performance to display the different astronomers' models (helio and geo centric)</li> <li>- Using an atlas, the children create a time zone map</li> <li>- Recreate earth, sun and moon to display their movement</li> <li>- Making a sundial</li> </ul> <p><b>Learning Journey:</b>  Science EY – Day and night  Science Y3 – Light and shadow  Science Y5 – Forces</p>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>- Objects like planets, moons and stars spin.</li> <li>- Smaller mass objects like planets orbit large mass objects like stars.</li> <li>- Stars produce vast amounts of heat and light.</li> <li>- All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.</li> <li>- Name the 8 planets in order from the sun.</li> </ul> <p>Explain the Goldilocks' principle in accordance to their home planet- earth Explain how day and night happen due to the movement of the sun.</p> <p>Name and explain why there are different moon phases</p> <p>Recap sunrise and sunset and the seasons variation across the world</p> <p><b>Beyond living memory...</b> Nicolaus Copernicus (1473 - 1543)  Galileo Galilei (class reader)</p> <p><b>Within living memory...</b> Rosalind Franklin (1920 - 1958)  Hidden Figures (class reader)</p> <p><b>Key vocabulary:</b></p>
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<p style="text-align: center;"><b>Forces</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>• Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>- Measure with precision - a Newton meter to measure forces</li> <li>- Observing – which parachute takes longest to land (Air resistance)</li> <li>- Fair test – test parachutes</li> </ul> <p>Scientific drawing – levers, gears and pulleys</p>	<p><b>Investigation questions:</b></p> <p>What is the difference between mass, weight and gravity?          What is water resistance and how does shape effect water resistance?          What is the difference between mass, weight and gravity?          What are levers, gears and pulleys?</p> <p><b>Key activities in the unit of work are:</b></p> <p>Investigating dropping balls/paper          Measuring force in different items.</p> <p><b>Air resistance:</b></p> <ul style="list-style-type: none"> <li>- Using parachutes to explore the effects of air resistance - focus on accurate measuring</li> <li>- Measure the effect of gravity using a newton meter</li> </ul> <p><b>Water resistance:</b></p> <ul style="list-style-type: none"> <li>– Using plasticine to mould different shapes to test which shape would fall to the bottom of a tank of water fastest.</li> </ul> <p>Investigate the best friction shoe for James Bond.</p> <p>Design a contraption that uses at least one of each - lever, pulley and gears.</p> <p><b>Learning Journey:</b></p> <ul style="list-style-type: none"> <li>- Science Y3 – Magnets</li> <li>- Science Y5 – Space</li> <li>- DT – Pulleys – Moving Toys</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>- That gravity is a force which pulls objects towards the earth.</li> <li>- Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.</li> <li>- Know that friction is a force against motion caused by two surfaces rubbing against each other.</li> <li>- Understand that some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move</li> </ul> <p><b>Beyond living memory...</b> Isaac Newton (1643-1727)  <b>Within living memory...</b> Elon Musk (1971-present)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2</b> simple machine, effort, load, float, sink, streamlined,  <b>Tier 3:</b> friction, resistance, forcemeter, contact force, gravity, gravitational pull, mass, matter, air resistance, water resistance, drag, upthrust, displace, lever, pulley, gear, transmission, mesh, axle, fulcrum, pivot, mechanisms, redirecting force</p>
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<p><b>Year 6</b></p> <p><b>Light</b></p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• Recognise that light appears to travel in straight lines.</li> <li>• 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.</li> <li>• Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</li> <li>• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>- Observing: How does refraction work and how does this affect what we see?</li> <li>- Recording results using scientific diagrams including a line graph.</li> <li>- Analyse data to draw conclusions of how shadows change throughout the day.</li> <li>- Use scientific language, illustrations and language</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>- What is light and how does it travel?</li> <li>- How do we see and how do our eyes work?</li> <li>- What is reflection and how does it help us to see?</li> <li>- What colour is light? Is this a phenomenon?</li> <li>- What is refraction and why is it a phenomenon?</li> <li>- Is a shadow always the same shape as the object that casts it?</li> <li>- How does a mirror reflect light?</li> <li>- How do you see out of a submarine?</li> <li>- What is refraction and how does it change what we see?</li> <li>- What colour is light and how do we see different colours?</li> <li>- Why are shadows the same shape at the objects that cast them?</li> <li>- How can shadows be changed?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- Drawing a scientific diagram of how light travels and how we see objects.</li> <li>- Investigating how light reflects using torches and mirrors.</li> <li>- Labelling a diagram of an eye using scientific vocabulary</li> <li>- Explaining how a periscope works and making one out of card.</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>- Understand how light travels in straight lines</li> <li>- Will be able to explain how light travels from a light source into our eyes and draw diagrams to show this.</li> <li>- Know that light can be distorted through refraction and explain why this happens.</li> <li>- White light is made up of a spectrum of 7 different colours.</li> <li>- Identify objects which are more reflective than others and explain why.</li> <li>- Match shadow shapes to shapes of objects which produce them.</li> <li>- Name parts of the human eye eg retina, lens, pupil, optic nerve</li> </ul> <p><b>Beyond living memory...</b> Ibn al-Haytham (965 – 1040)</p> <p><b>Within living memory...</b> Jo Shien Ng (1975 - present)</p> <p><b>Key vocabulary:</b></p> <p><b>Tier 2</b> beam, ray, shadow, cast, object, reflect, light source,</p> <p><b>Tier 3:</b> energy, distortion, factor, incident ray, reflected ray, angle of incidence, angle of reflection, normal line, phenomenon, refraction, spectrum, prism</p>
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<p>Electricity</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>• 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.</li> <li>• Recognise symbols when representing a simple circuit in a diagram.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>- Comparative/fair testing – investigate the effect of adding more bulbs, cells and higher voltage to a circuit.</li> <li>- Predicting – Make predictions as to whether or not circuits will ‘work’</li> </ul>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>- What is a circuit and how can each component be represented?</li> <li>- How do you ensure a circuit is complete?</li> <li>- How does voltage affect different components in a circuit?</li> <li>- How can I use my knowledge of electrical components to make a device?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>- Make a variety of circuits with different components and draw them using scientific symbols</li> <li>- Predict from an image whether or not a circuit will be complete and give reasons</li> <li>- Investigate what happens to the brightness of a lamp/volume of a buzzer when voltage/number of cells is increased.</li> <li>- Instructional writing for making a panic button</li> <li>-</li> </ul> <p>Learning Journey:</p> <ul style="list-style-type: none"> <li>- Science Y4 – Electricity</li> <li>- D.T. Y6 Moving Vehicles- working head lamp</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>- To be able to draw/represent electrical components as scientific symbols</li> <li>- Know that the higher the voltage the brighter or stronger or louder the results of the components.</li> <li>- Identify whether or not a circuit will work by looking at a picture of a circuit.</li> </ul> <p>Beyond living memory... Nikola Tesla (1856-1943)</p> <p>Within living memory... M.Stanley Whittingham (1941-present)</p> <p>Key vocabulary:</p> <p>Tier 2 symbol, device</p> <p>Tier 3: series circuit, cell, battery, component, voltage</p>
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<p>Animals including humans</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way our bodies function.</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul> <p>Working Scientifically Focus:</p> <ul style="list-style-type: none"> <li>Research – children present information about how nutrients and water are transported around the body and create an advert for their food group.</li> <li>Observing – observe pulse rates before, during and after exercise.</li> <li>Results – drawing a line graph to show results of pulse rate investigation</li> </ul> <p>Comparative testing – what type of exercise has the greatest effect on our heart rate?</p>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>Can you name the main parts of the circulatory system?</li> <li>What are the functions of the heart, blood vessels and blood?</li> <li>How are nutrients and water transported in the body?</li> <li>How does exercise effect my pulse rate? How can I find out?</li> <li>How do diet, exercise, drugs and lifestyle impact our bodies?</li> <li>Why is blood so important?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>Label a scientific diagram and explain the key functions of each part of the circulatory system</li> <li>Make a presentation in groups to explain how nutrients and water are transported around the body</li> <li>Cause and effect map regarding lifestyle choices</li> <li>In groups, create an advert for a particular food group</li> <li>Role play scenarios linked to how to cope when presented with drugs</li> <li>Investigate impact of exercise on heart rate – create a line graph to show results</li> </ul> <p>Learning Journey:</p> <ul style="list-style-type: none"> <li>Science Y4 – Digestive system</li> <li>Science Y3 – Skeletons and food groups</li> <li>Science Y2 – Healthy eating</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>Know that the heart pumps blood around the body.</li> <li>Name the main parts of the circulatory system.</li> <li>Explain how nutrients and water move around the body.</li> <li>Understand how drugs, smoking and exercise impact us – explain pros and cons.</li> </ul> <p>Beyond living memory... William Harvey (1578-1657)</p> <p>Within living memory... Donald Palmer (1962-</p> <p>Key vocabulary:</p> <p>Tier 2 pump, heart, lifestyle, drugs, medicine, illegal, vitamins</p> <p>Tier 3: circulatory system, organ, blood vessels, arteries, veins, capillaries, living cells, oxygen, carbon dioxide, deoxygenated, oxygenated, platelets, plasma, red/white blood cells, antibodies, single/double circulatory system, nicotine, caffeine, proteins, stimulant, hallucinogen, depressant, nicotine, ethanol</p>
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<p>Living things and their habitats</p>	<p><b>Pupils will learn to:</b></p> <ul style="list-style-type: none"> <li>• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.</li> <li>• Give reasons for classifying plants and animals based on specific characteristics.</li> </ul> <p><b>Working Scientifically Focus:</b></p> <ul style="list-style-type: none"> <li>- Classifying – classify animals according to Carl Linnaeus' system</li> </ul>	<p><b>Investigation questions:</b></p> <ul style="list-style-type: none"> <li>- How can these living things be classified?</li> <li>- Who was Carl Linnaeus and how did he help to classify things?</li> <li>- Are there many similarities between animals in the local area?</li> <li>- Is there a link between plant groups and the environment they grow in?</li> <li>- Do microorganisms matter?</li> </ul> <p><b>Key activities in the unit of work are:</b></p> <ul style="list-style-type: none"> <li>- Build on Y4 knowledge by sorting living things in a variety of ways.</li> <li>- Draw classification keys and a tree map.</li> <li>- Research an animal eg cat to then classify</li> </ul> <p><b>Learning Journey:</b></p> <ul style="list-style-type: none"> <li>- Science Y4 – Classification keys</li> </ul>	<p><b>When assessed, pupils will demonstrate the following component knowledge:</b></p> <ul style="list-style-type: none"> <li>- Understand how to classify living things.</li> <li>- Explain who Carl Linnaeus was and why he is famous</li> </ul> <p><b>Beyond living memory...</b> Carl Linnaeus (1707-1778)  <b>Within living memory...</b> Tanesha Williams (1985-</p> <p><b>Key vocabulary:</b>  <b>Tier 2:</b> insects, algae, moss, fern, conifer, bacteria  <b>Tier 3:</b> vertebrate/non-vertebrate, taxonomy, arachnids, crustaceans, millipedes, annelids, echinoderms, molluscs, coelenterates, dichotomous key, ginkgoes, angiosperms, microorganism, microbes, fungi, protists</p>
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<p>Evolution and inheritance</p>	<p>Pupils will learn to:</p> <ul style="list-style-type: none"> <li>• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</li> <li>• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul> <p>Working Scientifically Focus:</p> <p>- Research - What happened when Charles Darwin visited the Galapagos islands? How are different species adapted to their environments?</p> <p>Report findings and use presentations.</p> <p>Pattern seeking – different equipment</p>	<p>Investigation questions:</p> <ul style="list-style-type: none"> <li>- What does inheritance mean and where do our characteristics come from?</li> <li>- How are living things adapted to survive in their environment?</li> <li>- What does extreme survival mean?</li> <li>- Who is Charles Darwin and what does he have to do with evolution?</li> <li>- How do fossils provide is with evidence about the past?</li> <li>- How does variation explain the different features and characteristics of living things?</li> <li>- How do scientists know that living things have changed over time?</li> <li>- How have plants in the local area adapted overtime?</li> </ul> <p>Key activities in the unit of work are:</p> <ul style="list-style-type: none"> <li>- characteristics compare with a partner</li> <li>- Research and learn about how camels, cacti and penguins have adapted to suit their environment</li> <li>- Create own creature designed to suit and survive in a specific habitat</li> <li>- To compare how finches differed in the Galapagos islands and to test out the effectiveness of different beaks – focus on analysing results.</li> <li>- Map out timeline of planet earth in the playground</li> <li>- Remove choc chips from cookies – links to fossil hunting.</li> </ul>	<p>When assessed, pupils will demonstrate the following component knowledge:</p> <ul style="list-style-type: none"> <li>• Life cycles have evolved to help organisms survive to adulthood.</li> <li>• Explain that over time the characteristics that are most suited to the environment become increasingly common eg the peppered moth.</li> <li>• Name characteristics one gets from ones parents and which they don't</li> <li>• Understand that animals like camels and penguins have changed over time to suit the environment in which they live</li> </ul> <p>Beyond living memory... Charles Darwin (1809 – 1882)</p> <p>Within living memory... Sylvia Earle (1935 – present)</p> <p>Key vocabulary:</p> <p>Tier 2 diversity, siblings, characteristics, traits, habitats, climate, extinction, crossbreed</p> <p>Tier 3: evolution, mould/body/trace/ cast fossil, fossil record, species, variation, inheritance, inherited/environmental variation, selective-breeding, natural selection, adaptation, organism, pollinators</p>
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Learning Journey:

- Science Y3 – Rocks and soils
- Geography Y2 – Penguins
- PSHE – characteristics/offspring
- Geography Y6 – Frozen Kingdoms

Trips:

London Zoo

Local park