

For specific progression of scientific skills for each year group see working scientifically skills ladders.

Outdoor learning is a focus throughout each unit.

TOPIC	SCIENCE	KNOWLEDGE	KEY SKILLS	KEY VOCABULARY
<p>CYCLE A LIFE IN LIVERPOOL</p> <p>AUTUMN</p>	<p>ANIMALS INCLUDING HUMANS</p> <p><b>HEALTH</b></p>	<p><u>Skeletal and movement</u></p> <ul style="list-style-type: none"> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> <li>Identify animals (vertebrates) which have a skeleton which supports their body, aids movement &amp; protects vital organs (e.g. name and locate skull, backbone, ribs, bones for movement/limbs, pelvis and be able to name some of the vital organs protected).</li> <li>Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move &amp; protect their vital organs.</li> <li>Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.</li> <li>Know that muscles, which are attached to the skeleton, help animals move parts of their body.</li> <li>Explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth – e.g. do people with longer legs have longer arm spans?</li> <li>Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.</li> </ul> <p><u>Health and nutrition</u></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>An adequate and varied diet is beneficial to health (along with a good supply of air and clean water).</li> </ul>	<ul style="list-style-type: none"> <li>Identifying and grouping animals with and without skeletons.</li> <li>Observing and comparing their movement.</li> <li>Exploring ideas about what would happen if humans did not have skeletons.</li> <li>Comparing and contrasting the diets of different animals (including their pets).</li> <li>Decide ways of grouping them according to what they eat.</li> <li>Researching different food groups and how they keep us healthy.</li> <li>Designing meals based (Create / Invent/ Design) on what they find out.</li> </ul> <p><b>Focus Skills</b> <b>Questioning</b></p>	<p>Words relating to skeletons and muscles e.g. ribs, spine, skull, contract, relax, vertebrate</p> <p>Features of skeletons: movement, support, protection (organs)</p> <p>Words which have other meanings in other contexts e.g. relax</p> <p>Animal groups: vertebrates and invertebrates, insects, minibeasts, mammals, reptiles, fish, birds, amphibians</p> <p>Food/feed/feeding, growth, activity, healthy, unhealthy, nutrition, exercise, choice, balanced diet, lifestyle, adequate and varied diet, the right types and amount of nutrients</p> <p>Food groups e.g. vegetables, meat, fish, sugars and starches, fruit, fats</p> <p>Words which have different meanings in other contexts e.g. diet, activity, evidence, conclusion</p>

		<ul style="list-style-type: none"> <li>• <u>Regular and varied exercise from a variety of different activities is beneficial to health (focus on energy in versus energy out. Include information on making informed choices).</u></li> </ul>		
<p>CYCLE A LIFE IN LIVERPOOL</p> <p>AUTUMN</p>	<p>FORCES AND MAGNETS</p>	<ul style="list-style-type: none"> <li>• Compare how some things move on different surfaces.</li> <li>• <u>Notice that some forces need contact between two objects but magnetic forces can act at a distance.</u></li> <li>• <u>Observe how magnets attract or repel each other and attract some materials and not others.</u></li> <li>• <u>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.</u></li> <li>• <u>Describe magnets as having two poles (like and unlike poles).</u></li> <li>• <u>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</u></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Comparing</b> how different things move and grouping them.</li> <li>• <b>Raising questions and carrying out tests</b> to find out how far things move on different surfaces.</li> <li>• <b>Gathering and recording data</b> to find answers to their questions.</li> <li>• <b>Exploring</b> the strengths of different magnets and <b>finding a fair way to compare them.</b></li> <li>• <b>Sorting materials</b> into those that are magnetic and those that are not.</li> <li>• <b>Looking for patterns</b> in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.</li> <li>• <b>Identifying how these properties make magnets useful in everyday items</b> and suggesting creative uses for different magnets.</li> </ul> <p><b>Focus Skills</b>  <b>Planning and testing</b>  <b>Considering results of an investigation</b></p>	<p>Move, <b>movement</b>: fly, bounce, slide, spin, roll, swirl, swing, forward, backward, upwards, downwards, faster, slower, accelerate, decelerate, ramp, incline</p> <p>push, pull, squeeze, springy, <b>attract, repel, magnetic, non-magnetic, attraction, repulsion</b>, names of common metals (e.g. iron, copper, aluminium), <b>poles, horseshoe magnet, bar magnet, ring magnet, button magnet</b></p> <p>Stronger / weaker, best / worse</p>
<p>CYCLE A THE ROCK DAYS</p> <p>SPRING</p>	<p>ELECTRICITY</p>	<ul style="list-style-type: none"> <li>• Identify common appliances that run on electricity.</li> <li>• <u>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</u></li> <li>• <u>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.</u></li> <li>• <u>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</u></li> <li>• <u>Recognise some common conductors and insulators, and associate metals with being good conductors.</u></li> <li>• Electricity can be dangerous.</li> <li>• Electricity sources can be mains or battery.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Observing/noticing patterns</b>, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.</li> </ul> <p><b>Focus Skills</b>  <b>Using equipment</b></p>	<p>cell (battery), wire, bulb, bulb holder, buzzer, motor, switch (open/closed), circuit, electrical conductor, electrical insulator,</p> <p>connection, component, break,</p> <p>devices, appliances, mains electricity, safety</p> <p>common materials e.g. metal, wood, plastic</p> <p>Expressions for making suggestions using 'if', 'might', 'could'  connection, mains, wire, break</p> <p>Comparative expressions e.g. brighter, less bright (bulbs); faster, slower (motors)</p> <p>Note words which have a different meaning in other contexts e.g. circuit, break, bulb).</p>

		<ul style="list-style-type: none"> <li>Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work.</li> <li>Faults in circuits can be found by methodically testing connections.</li> <li>Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2).</li> </ul>		
<p>CYCLE A THE ROCK DAYS</p> <p>SPRING</p>	ROCKS	<ul style="list-style-type: none"> <li><u>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</u></li> <li><u>Describe in simple terms how fossils are formed</u> when things that have lived are trapped within rock.</li> <li><u>Recognise that soils are made from rocks and organic matter</u></li> <li>Recognise that rocks and soils can feel and look different.</li> <li>Recognise that rocks and soils can be different in different places/environments.</li> </ul>	<ul style="list-style-type: none"> <li><b>Observing</b> rocks, including those used in buildings and gravestones.</li> <li><b>Exploring</b> how and why they might have changed over time.</li> <li><b>Using (equipment)</b> a hand lens or microscope to help them.</li> <li><b>Identify and classify</b> rocks according to whether they have grains or crystals, and whether they have fossils in them.</li> <li><b>Research</b> and discuss the different kinds of living things whose fossils are found in sedimentary rock.</li> <li><b>Explore</b> how fossils are formed.</li> <li><b>Explore</b> different soils and ...</li> <li><b>Identify similarities and differences</b> between them and <u>describe the composition of soil.</u></li> <li><b>Investigate</b> what happens when rocks are rubbed together (<u>classify according to hardness</u>) or what changes occur when they are in water.</li> <li><b>Raise and answer questions</b> about the way soils are formed.</li> </ul> <p><b>Focus Skills</b> Grouping and classifying</p>	<p>Words describing rocks e.g. rock, stone, pebble, slate, marble, chalk, granite, sand, sandstone, hard, texture, grains, crystals, contain fossils, bits pressed together, sedimentary.</p> <p>Words describing soils e.g. darker, lighter, organic matter, leaf litter, grains, clay, sandy, grains.</p> <p>Rub together, break apart/break up, permeable, non-permeable, acid rain, weathering, erosion.</p> <p>Comparison/compare, description/describe.</p> <p>Words which have different meanings in other contexts e.g. test, fair, conclude.</p>
<p>CYCLE A ITALY</p> <p>SUMMER</p>	LIGHT	<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><u>Notice that light is reflected from surfaces.</u></li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li><u>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</u></li> <li><u>Find patterns in the way that the size of shadows can change.</u></li> </ul>	<ul style="list-style-type: none"> <li><b>Looking for patterns</b> in what happens to shadows when the light source moves or the distance between the light source and the object changes.</li> </ul> <p><b>Focus Skills</b> Collaborating</p>	<p>see, seen, light source, eyes, travel, torch</p> <p>shadow, opaque, block</p> <p>reflect, reflection, mirror, direction</p> <p>light travels, straight lines,</p> <p>Comparisons e.g. shortest, highest, furthest, closest</p>
<p>CYCLE A ITALY</p> <p>SUMMER</p>	PLANTS	<ul style="list-style-type: none"> <li><u>Identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</u></li> </ul>	<ul style="list-style-type: none"> <li><b>Comparing</b> the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser;</li> </ul>	<p>Flowering plant, root/roots, leaf/leaves, stem/trunk, flowers, pollen, transfer, pollination, seed formation, seed, fruit, seed</p>

		<ul style="list-style-type: none"> <li>• <u>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.</u></li> <li>• <u>Investigate the way in which water is transported within plants.</u></li> <li>• <u>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</u></li> <li>• Roots grow downwards and anchor the plant.</li> <li>• Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit.</li> <li>• Nutrients (not food) are taken in through the roots.</li> <li>• Stems provide support and enable the plant to grow towards the light.</li> <li>• Plants make their own food in the leaves using energy from the sun.</li> <li>• Flowers attract insects to aid pollination.</li> <li>• Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind.</li> <li>• Seeds are formed after the flowers are pollinated.</li> <li>• Many flowers produce fruits which protect the seed and/or aid seed dispersal.</li> <li>• Seed dispersal, by a variety of methods, helps ensure that new plants survive.</li> <li>• Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil).</li> </ul>	<ul style="list-style-type: none"> <li>• Discovering (<b>research and modelling</b>) how seeds are formed by</li> <li>• <b>Observing</b> the different stages of plant cycles over a period of time;</li> <li>• <b>Looking for patterns</b> in the structure of fruits that relate to how the seeds are dispersed.</li> <li>• <b>Observing</b> how water is transported in plants, for example, by putting cut, white carnations into coloured water.</li> <li>• <b>Observing</b> how water travels up the stem to the flowers.</li> </ul> <p><b>Focus skills</b> Explore and observe</p>	<p>dispersal (explosion, wind, water, animal), transported, insects/birds/animals</p> <p>Life cycle, growth, reproduce, air, light, water, nutrients, soil, room to grow, fertiliser</p> <p>Words to describe physical characteristics of plants e.g. yellow, pale, thin, spindly, features representing good growth</p> <p>Volume (liquids)</p>
<p>CYCLE B CHANGING BRITAIN</p> <p>AUTUMN</p>	<p>MATERIALS - STATES OF MATTER</p>	<ul style="list-style-type: none"> <li>• <u>Compare and group materials together, according to whether they are solids, liquids or gases.</u></li> <li>• <u>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).</u></li> <li>• <u>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</u></li> <li>• Solids, liquids and gases can be identified by their observable properties.</li> <li>• Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).</li> <li>• Liquids can pour and take the shape of the container in which they are put.</li> <li>• Liquids form a pool not a pile.</li> <li>• Solids in the form of powders can pour as if they were liquids but make a pile not a pool.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Grouping and classifying</b> a variety of different materials.</li> <li>• <b>Exploring</b> the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party).</li> <li>• <b>Researching</b> the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid.</li> <li>• <b>Observing and recording</b> evaporation over a period of time, such as a puddle in the playground or washing on a line.</li> <li>• <b>Investigating</b> the effect of temperature on washing drying or snowmen melting.</li> <li>• Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT.</li> </ul>	<p>Solid, liquid, gas, property, change, temperature, change state, heated, cooled, temperature, degrees Celsius, water cycle</p> <p>condensation/condense, evaporation/evaporate, melting/melt, freezing/freeze, solidification/solidity, boiling temperature</p> <p>particle, air, carbon dioxide, oxygen, helium, natural gas, viscosity,</p> <p>States of matter</p> <p>Measure, compare, group, research, observe</p>

		<ul style="list-style-type: none"> <li>Gases fill the container in which they are put.</li> <li>Gases escape from an unsealed container.</li> <li>Gases can be made smaller by squeezing/pressure.</li> <li>Liquids and gases can flow.</li> </ul>	<ul style="list-style-type: none"> <li>This unit provides an ideal opportunity for <b>using data logging equipment</b> to detect/measure and compare temperatures</li> </ul> <p>Focus skills Collaborating Modelling</p>	
<p>CYCLE B BRAZILLIAN RAINFOREST</p> <p>SPRING</p>	<p>SOUND</p>	<p>Vibrations</p> <ul style="list-style-type: none"> <li><u>Identify how sounds are made, associating some of them with something vibrating.</u></li> <li><u>Recognise that vibrations from sounds travel through a medium to the ear.</u></li> <li><u>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</u></li> <li><u>Recognise that sounds get fainter as the distance from the sound source increases.</u></li> <li>Recognise that sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body).</li> <li>Sounds travel away from their source in all directions.</li> <li>Vibrations may not always be visible to the naked eye.</li> </ul> <p>Pitch</p> <ul style="list-style-type: none"> <li><u>Find patterns between the pitch of a sound and features of the object that produced it.</u></li> <li>Sounds can be high or low pitched.</li> <li>The pitch of a sound can be altered.</li> <li>Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column.</li> </ul> <p>Muffling/blocking sounds</p> <ul style="list-style-type: none"> <li><u>Recognise that vibrations from sounds travel through a medium to the ear.</u></li> <li>Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase).</li> <li>Sounds can travel through solids, liquids and air/gas by making the materials vibrate.</li> <li>Sound travel can be reduced by changing the material that the vibrations travel through.</li> <li>Sound travel can be blocked.</li> </ul>	<ul style="list-style-type: none"> <li><b>Finding patterns</b> in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.</li> <li>They might make ear muffs from a variety of different materials <b>to investigate /test</b> which provides the best insulation against sound.</li> <li>They could <b>make [create/invent/design]</b> and play their own instruments by <b>using what they have found out</b> about pitch and volume.</li> <li>Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT across the curriculum</li> <li>This unit provides an ideal opportunity for <b>using data logging equipment</b> to detect/measure and compare sounds.</li> </ul> <p>Focus Skills Planning and testing</p>	<p>Pitch, loudness, vibrate, vibration, muffle, tuning, quiet, soft, noise, sound, loudness, loud, volume, tension, tight, air, air column, muffle</p>

<p>CYCLE B BRAZILLIAN RAINFOREST</p> <p>SPRING</p>	<p>LIVING THINGS AND THEIR HABITATS</p> <p><b>ENVIRONMENT</b></p>	<ul style="list-style-type: none"> <li>• <u>Recognise that living things can be grouped in a variety of ways.</u></li> <li>• <u>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</u></li> <li>• <u>Recognise that environments can change and that this can sometimes pose dangers to living things.</u></li> <li>• Use and make identification keys for plants and animals.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Using and making simple guides or keys [grouping &amp; classifying]</b> to explore and identify local plants and animals.</li> <li>• <b>Making a guide [grouping &amp; classifying]</b> to local living things.</li> <li>• <b>Raising and answering questions</b> based on their <b>observations</b> of animals and</li> <li>• what they have found out about other animals that they have <b>researched</b>.</li> </ul> <p><b>Focus skills</b> Classification Grouping Questioning</p>	<p>Words related to life processes e.g. nutrition, habitats and feeding</p> <p>Relationships e.g. habitat, condition, organism, predator, prey, producer, consumer, food chain, key, classify</p> <p>Words which have a different meaning in other contexts e.g. producer, consumer, key, condition</p> <p>Vertebrates and invertebrates, insects, minibeasts, mammals, reptiles, fish, birds, amphibians (these animal groups may be discussed here but the main focus of this key learning should be introduced in LKS2 'Animals' unit)</p>
<p>CYCLE B ANCIENT EGYPT</p> <p>SUMMER</p>	<p>ANIMALS INCLUDING HUMANS</p>	<p><u>Teeth and Digestion</u></p> <ul style="list-style-type: none"> <li>• <u>Describe the simple functions of the basic parts of the digestive system in humans.</u></li> <li>• <u>Identify the different types of teeth in humans and their simple functions.</u></li> <li>• <u>Construct and interpret a variety of food chains, identifying producers, predators and prey (NB Link with types of teeth and eating in this unit but this concept could be developed further in the yr4 Environment / habitats unit).</u></li> <li>• Describe how teeth and gums have to be cared for in order to keep them healthy.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Comparing</b> the teeth of carnivores and herbivores.</li> <li>• <b>Suggesting reasons</b> for differences [grouping &amp; classifying].</li> <li>• <b>Finding out [testing and/or researching]</b> what damages teeth and how to look after them.</li> <li>• <b>Drawing and discussing their ideas</b> about the digestive system.</li> <li>• <b>Comparing</b> them with ...</li> <li>• ... <b>models</b> or images.</li> </ul> <p><b>Focus skills</b> Modelling</p>	<p>Eat, chew, breakdown, saliva, swallow, feed, feeding, healthy, unhealthy, function, producer, predator, prey, dentist, toothpaste, dental care, hygienist</p> <p>Teeth, gums, incisor, molar, canine.</p> <p>Digestive system, mouth, tongue, oesophagus, stomach, small intestine, large intestine, faeces.</p> <p>Words which have different meanings in other contexts e.g. diet, root, activity, decay, evidence, conclusion.</p> <p>Other words which might arise through discussion / research but are not essential: peristalsis, digestive juices, churn, energy, nutrients, absorbed, blood, liver, bladder, anus.</p>