







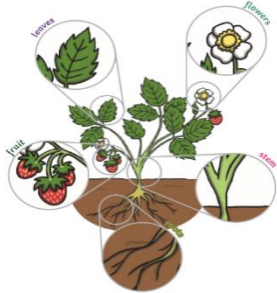
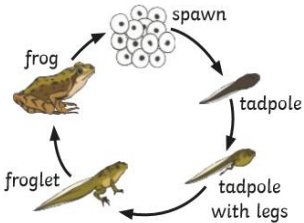
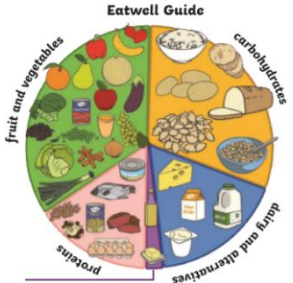
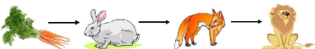

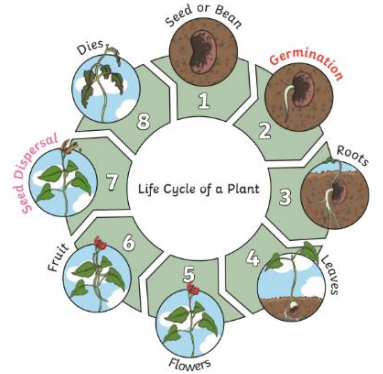




## Science: Knowledge, Skills and Vocabulary Routeway

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	<p>In Reception, children are taught using the new 2021 Early Learning Goals following the St John's Progression in Learning Framework.</p> <p style="background-color: #90EE90; display: inline-block; padding: 2px;">ELG: The Natural World</p> Children at the expected level of development will: <ul style="list-style-type: none"> <li>Explore the natural world around them, making observations and drawing pictures of animals and plants</li> <li>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               <ul style="list-style-type: none"> <li>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter</li> </ul> </li> </ul> <p>Science Skills, Vocabulary and Knowledge are taught during Adult led and child-initiated learning with sustained shared thinking in preparation to investigate and explore independently through continuous provision.</p>					
Year 1	<p style="text-align: center;"><b>Area of Science: Physics</b> <b>Strand: The World Around Us / Seasonal Changes</b></p> <p><u>National Curriculum and Key Knowledge</u> Observe and describe weather associated with Autumn and how day length varies (<b>knowledge that Autumn follows Summer and comes before Winter. Autumn has cooler temperatures, heavier rain/fall and shorter days.</b>)</p> <p style="text-align: center;"><u>Vocabulary</u> Seasons, Autumn, weather, daylight, day, night time, night, rain, cool, cold, sun, warm, temperature</p> <p style="text-align: center;"><u>Skills to develop Scientific Enquiry</u> Record information about the weather</p> <p>Create displays of what happens in the world around them including day length and seasonal changes.</p> <div style="text-align: center;">  </div>	<p style="text-align: center;"><b>Area of Science: Biology</b> <b>Strand: Animals inc. Humans</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify and name a variety of common animals including fish, amphibians, birds and mammals (<b>knowledge that there are 6 types of animals; vertebrates, mammals, birds, fish, amphibians, reptiles.</b>)</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores (<b>knowledge:</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) (<b>knowledge that animals have different skeletons and features making them well suited to their habitat</b>)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each</p>	<p style="text-align: center;"><b>Area of Science: Physics</b> <b>Strand: Seasonal Change</b></p> <p><u>National Curriculum and Key Knowledge</u> Observe and describe weather associated with Winter and how day length varies (<b>knowledge that Winter follows Autumn and comes before Spring. It is cold in Winter and that sometimes temperatures drop to freezing leaving frost and sometimes snow on the ground. Knowledge that the daytimes are the shortest in the year and the night times are the longest.</b>)</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><u>Vocabulary</u> Seasons, Winter, weather, freezing, cold, ice, hail, sleet, temperature, frost, snow</p> <p style="text-align: center;"><u>Skills to develop Scientific Enquiry</u> Record information about the weather. Create displays of what happens in the world around them including day length and seasonal changes</p> <p style="text-align: center;"><b>Area of Science: Chemistry</b> <b>Strand: Everyday Materials</b></p> <p><u>National Curriculum and Key Knowledge</u> Distinguish between an object and the material from which it is made (<b>knowledge that materials can be used to create different objects</b>)</p>	<p style="text-align: center;"><b>Area of Science: Physics</b> <b>Strand: Seasonal Change</b></p> <p><u>National Curriculum and Key Knowledge</u> Observe and describe weather associated with Spring / Summer and how day length varies (<b>knowledge that Spring and Summer follow Winter and the weather is the hottest during these months and we must stay safe in the sun. Knowledge of how the daytimes are the longest in the Year during Summer and the night times are the shortest. Knowledge that Spring brings with it new life – animals and plants.</b>)</p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> </div> <p style="text-align: center;"><u>Vocabulary</u> Seasons, Spring, Summer, weather, sun, hot, warm, new life, day, day time, night, night time</p> <p style="text-align: center;"><u>Skills to develop Scientific Enquiry</u> Record information about the weather</p>	<p style="text-align: center;"><b>Area of Science: Biology</b> <b>Strand: Plants</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (<b>knowledge of wild plants: dandelion, daisy, buttercup, nettles, brambles and garden plants: sun-flower, rose, lavender, iris, pansy. Knowledge that Yew, Pine and Holly trees are evergreen trees – leave stay green all year round and oak, sycamore and willow trees are deciduous trees – lose their leaves</b>)</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees (<b>knowledge of plant parts: - roots, leaves, flowers, stem, fruit.</b>)</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><u>Vocabulary</u> Deciduous, evergreen, garden plant, wild flowers, weed, Daisy, Dandelion, Buttercup, Brambles, Sun-flower, Nettles, Rose, Lavender, Sun-flower, Iris, Pansy, Oak tree, sycamore tree, willow tree, pine tree, willow, holly, bulb, seed, roots, stem, flowers, petal, leaves, fruit</p> <p style="text-align: center;"><u>Skills to develop Scientific Enquiry</u> Make observations, observing closely to compare and contrast familiar plants.</p>	

		<p>sense. (knowledge of body parts, where they are located and their function – head, hair, face, eyes, nose, mouth, ears, neck, shoulders, arms, elbows, hands, fingers, chest, waist, hips, back, legs, knees, feet and toes. Knowledge that sight is in relation to eyes, smell to nose, touch to hands, taste to mouth, hear to ear)</p> <p><u>Vocabulary</u> Fish, amphibian, bird, reptile, mammal, carnivore, omnivore, herbivore, consumer, habitat, see, hear, touch, smell, taste, head, hair, face, eyes, nose, mouth, ears, neck, shoulder, arms, elbows, hands, fingers, chest, waist, hips, back, legs, knees, feet, toes</p> <p><u>Skills to develop Scientific Enquiry</u> Gather observations (videos, photographs etc.) to compare, contrast and group animals and to explain how they have done this. Use the 5 senses to compare different textures, sounds and smells.</p>	<p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock (knowledge that metal, plastic, glass and paper are man-made and wood, water and rock are natural materials which we source from our environment.)</p> <p>Describe the simple physical properties of a variety of everyday materials (knowledge of adjectives to describe the materials above; rough, smooth, dull, shiny, bendy, not bendy)</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties (knowledge that materials can be sorted by their properties into hard and soft, opaque and transparent)</p> <p><u>Vocabulary</u> Object, material, hard, soft, stretchy, shiny, dull, rough, smooth, bendy, not bendy, transparent, opaque, man-made, natural, metal, plastic, glass, paper, water, rock</p> <p><u>Skills to develop Scientific Enquiry</u> Perform simple tests to explore questions surrounding various materials</p>	<p>Create displays of what happens in the world around them including day length and seasonal changes</p>	<p>Identify and group plants / trees by drawing diagrams.</p> <p>Keep a record of how plants / trees have changed over time – throughout the different seasons</p>
Year 2	<p><b>Area of Science: Biology</b> <b>Strand: Animals inc. Humans</b></p> <p><u>National Curriculum and Key Knowledge</u> Notice that animals, including humans, have offspring which grow into adults (Knowledge of the life cycles of a human, frog and butterfly.)</p>  <p>Find out about and describe the basic needs of animals, including humans, for survival (Knowledge that water, food and air are essential to ensure the survival of animals and humans)</p> <p>Describe the importance for humans of exercise, eating the right amounts different</p>	<p><b>Area of Science: Biology</b> <b>Strand: Living things and their habitats</b></p> <p><u>National Curriculum and Key Knowledge</u> Explore and compare the differences between things that are living, dead and things that have never been alive (knowledge that all living things grow, feed, reproduce and get rid of waste)</p> <p>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 (knowledge of different habitats and the animals that live in them: polar – penguins, polar bears, ocean – fish, octopus, whales, woodland – squirrels, owls, rain forest – monkeys, leopards, urban – pigeon, fox, desert – camels, snakes, coastal – crabs, star-fish, pond – frogs, fish)</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats (knowledge of how living things depend on each other – e.g. plants serving</p>	<p><b>Area of Science: Chemistry</b> <b>Strand: Uses of Everyday Materials</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses (knowledge that everyday materials have different purposes and that some materials are suitable / unsuitable for different purposes because of the properties they have.)</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (knowledge of how by squashing, bending, twisting and stretching a material can create different shapes and objects)</p>		<p><b>Area of Science: Biology</b> <b>Strand: Plants</b></p> <p><u>National Curriculum and Key Knowledge</u> Observe and describe how seeds and bulbs grown into mature plants (knowledge of plant growth – plant a seed / bulb in soil, watering it daily and placing the pot in a warm, sunny spot to grow)</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (knowledge that a plant needs sunlight, water, warmth, soil and time to grow and that it will not grow without these things.)</p>

<p>food, and hygiene (Knowledge of a balanced diet made up by the different food groups – fruit and veg, carbohydrates, dairy, fats and protein.)</p> <p><u>Vocabulary</u> Young, adult, offspring, develop, life cycle, reproduce, live young, life cycle, needs, water, air, food, balanced diet, food group, exercise, dehydrate, diet, disease, energy, exercise, germs, heart rate, hygiene, nutrition, pulse, carbohydrates, dairy, protein, fruit, vegetables, fats, healthy, unhealthy</p>  <p><u>Skills to develop Scientific Enquiry</u> Observe how different animals including humans grow.</p> <p>Suggesting ways to find answers to their questions.</p>	<p>as a source of food and shelter for animals.)</p> <p>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 (knowledge of simple food chains – draw these using arrows)</p>  <p><u>Vocabulary</u> Life processes, living, dead, never living, alive, food sources, food chain, habitat, micro-habitat, depend, survive, pond, coastal, ocean, urban, polar, woodland, rainforest, desert</p> <p><u>Skills to develop Scientific Enquiry</u> Sorting and classifying things according to whether they are living, dead or were never alive.</p> <p>Construct simple food chains, including humans.</p> <p>Describe and record the conditions of different habitats and micro-habitats.</p>	 <p><u>Vocabulary</u> Materials, suitability, properties, absorbent, non-absorbent, rigid, flexible, insulating, flammable, strong, magnetic, stretchy, waterproof, non-waterproof</p> <p>Prior vocab., shiny, smooth, dull, transparent, opaque, plastic, metal, glass, rock, wood, water</p> <p><u>Skills to develop Scientific Enquiry</u> Comparing the uses of everyday materials in and around the school with materials found in other places</p> <p>Identify and classify the uses of different materials</p>		 <p><u>Vocabulary</u> Germination, seed, bulb, sprout, roots, shoot, seed dispersal, sunlight, water, temperature, nutrition</p> <p><u>Skills to develop Scientific Enquiry</u> Setting up a comparative test to show that plants need light and water to stay healthy.</p> <p>Observe and record, with some accuracy, the stages of growth of a variety of plants as they change over time from a seed / bulb to a plant.</p>
<p>Year 3</p> <p><b>Area of Science: Biology</b> <b>Strand: Animals inc. Humans</b></p> <p><u>National Curriculum and Key Knowledge</u> 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 (knowledge that carbohydrates and fats provide us with energy, Protein helps growth and repair, Vitamins and Minerals keep us healthy, Fibre helps us to digest the foods we eat and water moves nutrients around our bodies, helping to get rid of waste.)</p>	<p><b>Area of Science: Chemistry</b> <b>Strand: Rocks</b></p> <p><u>National Curriculum and Key Knowledge</u> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (knowledge that igneous rock has been formed from Magma or Lava, Sedimentary rock has been formed by different layers of sediment which has been pressed down hard and formed together and Metamorphic rock starts out at igneous or sedimentary rock but changes when exposed to extreme heat or pressure.)</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock (knowledge that fossils are formed when an animal dies and decomposes leaving the skeleton and teeth</p>	<p><b>Area of Science: Physics</b> <b>Strand: Sound</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify how sounds are made, associating some of them with something vibrating (knowledge that sound is a type of energy which are created by vibrations – the louder the sound the bigger the vibration)</p>	<p><b>Area of Science: Physics</b> <b>Strand: Forces and Magnets</b></p> <p><u>National Curriculum and Key Knowledge</u> Compare how things move on different surfaces (knowledge that different surfaces create different amounts of friction)</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance (knowledge that magnets do not require contact due to magnetic force)</p>	<p><b>Area of Science: Biology</b> <b>Strand: Plants</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify and describe the functions of different parts of flowering plants: roots, stem / trunk, leaves and flowers (knowledge that the roots anchor the plant into the ground and absorb water which travels up the stem to the leaves which make food for the plant and flowers which grow seeds to make new plants.)</p>

Identify that humans and some other animals have skeletons and muscles for support, protection and movement (knowledge that skeletons protect the organs inside the body; allow movement and support the body – keeping it upright. Knowledge that muscles work in pairs to move the bones they are attached to.)



Vocabulary

Healthy, nutrients, energy, saturated fats, unsaturated fats, vertebrate, invertebrate, muscles, tendons, joints, bones, skeleton, contract, relax  
Previous vocab: Carbohydrate, Protein, Fats, Vitamins, Minerals, Water, Dairy, Food groups

Skills to develop Scientific Enquiry

Identifying and grouping different animals.

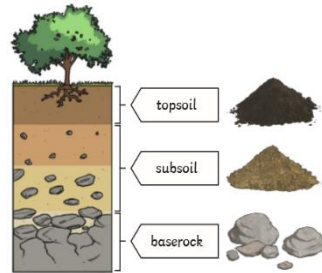
Explore what would happen if humans didn't have skeletons.

Compare and contrast the diets of different animals.

Explore and research different food groups.

behind which becomes buried under sediment over a long period of time eventually turning to rock. The bones eventually dissolve and a rock replica of the animal is formed.)

Recognise that soils are made from rocks and organic matter (knowledge that baserock consists of very large rocks, subsoil contains smaller stones and rocks and topsoil is where plants grow their roots.)



Vocabulary

Igneous rock, sedimentary rock, metamorphic rock, magma, lava, sediment, permeable, impermeable, density, durable, molecules, obsidian, chalk, marble, granite, sandstone, quartzite, basalt, limestone, slate, brick, concrete, stone, natural rocks, man-made rocks, fossilisation, palaeontology, erosion, decompose

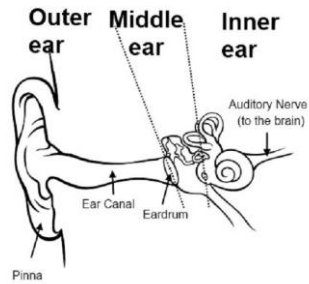
Skills to develop Scientific Enquiry

Observing rocks (including those used in buildings and gravestones.)

Using a hand lens or microscope to help to identify and classify rocks.

Research and discuss the different kinds of living things whose fossils are found in sedimentary rock.

Explore different soils, identifying similarities and differences between them.



Recognise that vibrations from sounds travel through a medium to the ear (knowledge that sounds are made when objects vibrate. The vibration makes the air around the object vibrate which enters the ear – we hear this as a sound.)

Find patterns between the pitch of a sound and features of the object that produced it (knowledge that the faster the vibrations the higher the pitch and the slower the vibrations the lower the pitch)

Find patterns between the volume of a sound and the strength of the vibrations that produced it (knowledge that instruments can be played louder, quieter, faster, slower, higher and lower.)

Recognise that sounds get fainter as the distance from the sound source increases (knowledge that a sound is louder when close to a sound source and gets quieter as you move further away.)

Vocabulary

Vibration, sound wave, amplitude, volume, pitch, loud, quiet, high, low, ear, particles, distance, soundproof, eardrum, absorb sound, vacuum,

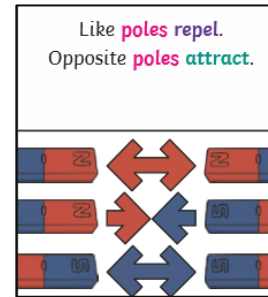
Skills to develop Scientific Enquiry

Finding patterns in the sounds that are made by different objects.

Investigate which materials provide the best insulation against sound.

Make and play own instruments.

Observe how magnets attract or repel each other and attract some materials and not others (knowledge that:



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 (knowledge that objects which are attracted to a magnet are magnetic. Objects containing iron, nickel or cobalt are magnetic.)

Describe magnets as having two poles (knowledge that magnets have a North and South pole at different ends.)

Predict whether two magnets will attract or repel each other, depending on which poles are facing (knowledge that like poles attract and opposite poles repel.)

Vocabulary

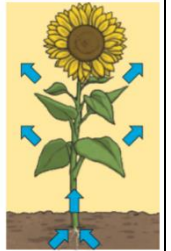
Forces, friction, surface, motion, push, pull, speed up, slow down, magnet, magnetic, non-magnetic, magnetic fields, poles, attract, repel

Skills to develop Scientific Enquiry  
Compare how different things move and grouping them accordingly.

Explore the different strengths of magnets.

Sorting materials into those that are magnetic and those that are not.

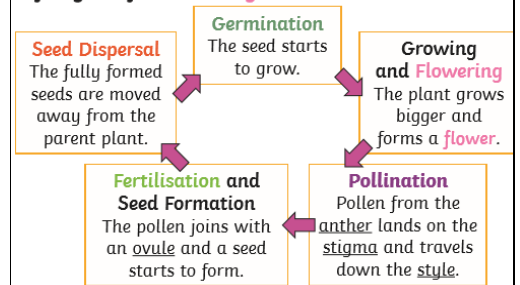
Explore the requirements of plants for life and growth and how they vary from plant to plant (knowledge that plants need air, light, water, nutrients from soil and room to grow)



Investigate the way in which water is transported within plants (knowledge of how water is transported throughout a plant by being absorbed by the roots, transported via the stem to the leaves where the water is then evaporated from the leaves leading to more water being sucked up by the stem)

Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal (knowledge of the continuing life cycle of a flowering plant:

**Life Cycle of a Flowering Plant**



Vocabulary

Re-cap previous vocabulary: roots, stem, leaves, flowers, seed dispersal, New Vocabulary; evaporation, nutrients, germination, flowering, seed formation, fertilisation, transportation

Skills to develop Scientific Enquiry  
Compare the effects of different factors on plant growth.

Observe how water is transported within plants.

Year 4

Area of Science: Chemistry  
Strand: States of Matter

Area of Science: Physics  
Strand: Electricity

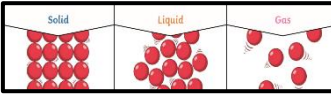
Area of Science: Biology  
Strand: Animals inc. Humans

Area of Science: Biology  
Strand: Living things and their habitats

Area of Science: Physics  
Strand: Light

National Curriculum and Key Knowledge

Compare and group materials together, according to whether they are solids, liquids or gases (knowledge that solids keep their shape unless a force is applied to them, liquids take the shape of the container they are in and gases can spread out to fill the container they are in.)



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 (knowledge that a solid can become a liquid when heated, a liquid can become a gas or can turn back into a solid when cooled.)

Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature (knowledge that condensation is when a gas turns into a liquid and evaporation is when a liquid turns into a gas. Knowledge of the processes involved in the water cycle)



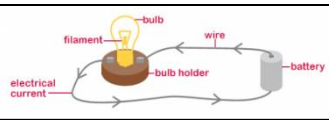
1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (precipitation).

Vocabulary

National Curriculum and Key Knowledge

Identify common appliances that run on electricity (knowledge that many everyday appliances rely on electricity to make them work and that they need to either be plugged in (mains) or battery operated.

Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers (knowledge that a circuit is a path for electricity to flow round and consists of wires and a battery connected to bulbs, switches or buzzers. Knowledge that electricity can only flow one way through a complete circuit that has no gaps.)



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 (knowledge that there must be wires connected to both the positive and negative end of the battery for a circuit to be complete.)

Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit (knowledge that switches can be used to open and close a circuit and that when off, a switch breaks the circuit to stop the flow of electrons. When the switch is on, the circuit is complete and the electrons are able to flow around the circuit.)

Recognise some common conductors and insulators, and associate metals with being good conductors (knowledge that silver, gold, copper and steel are good conductors of electricity and wood, plastic, glass and rubber are good insulators.)

Vocabulary

Electricity, generate, renewable, non-renewable, appliances, circuit, cell, electrons, conductor, lamp, switch, appliance, buzzer, bulb, battery, insulator

Skills to develop Scientific Enquiry

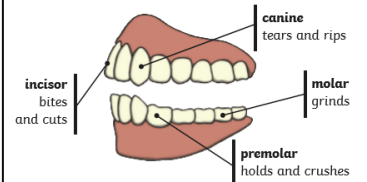
Observe patterns in circuits – for example, that bulbs get brighter if more cells are

National Curriculum and Key Knowledge

Describe the simple functions of the basic parts of the digestive system in humans (knowledge of the main body parts associated with the digestive system and their special functions – mouth, tongue, teeth, oesophagus, stomach and small and large intestine, rectum)

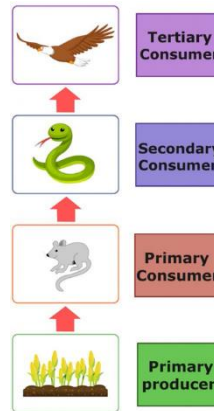
Identify the different types of teeth in humans and their simple functions (knowledge of the names of different teeth and their differing roles:

Human Teeth and Their Functions



Some people have wisdom teeth but they have no function now.

Construct and interpret a variety of food chains, identifying producers, predators and prey (knowledge of primary producers and primary, secondary and tertiary consumers:



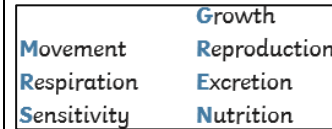
Vocabulary

Digest, oesophagus, stomach, small intestine, large intestine, rectum, producer, consumer, predator, prey, canine, incisor, molar, premolar  
Previous Vocabulary: Herbivore, Carnivore, Omnivore, Consumer

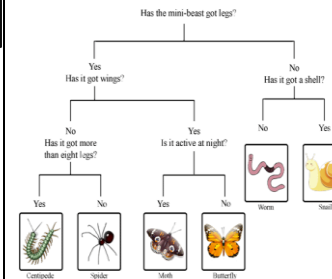
Skills to develop Scientific Enquiry

National Curriculum and Key Knowledge

Recognise that living things can be grouped in a variety of ways (knowledge that animals can be grouped into invertebrates – insects, spiders, worms, slugs and snails and vertebrates which can be separated into 5 groups: mammals, fish, birds, reptiles, amphibians.)



Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (knowledge that classification keys help identify, group and name a variety of living things.)



Recognise that environments can change and that this can sometimes pose dangers to living things (knowledge that natural changes – earthquakes, storms, floods, fires and man-made changes – deforestation, pollution, urbanisation can have both positive and negative effects on the environment.)

Vocabulary

Organisms, life processes, respiration, sensitivity, reproduction, excretion, environment, endangered species, extinct, classification, specimen, characteristics  
Prior vocabulary: invertebrate, vertebrate, habitat, nutrition

Skills to develop Scientific Enquiry

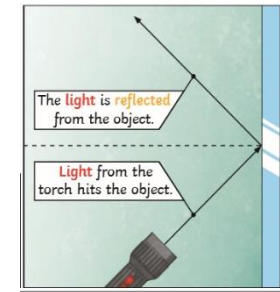
Using and making simple guides or keys.

Sharing research based on observations of animals.

National Curriculum and Key Knowledge

Recognise that we need light in order to see things and that the dark is the absence of light (knowledge that light travels in a straight line and is reflected – bounces off – when it hits a surface – if the reflected light hits our eyes, we can see an object.)

Notice that light is reflected from surfaces (knowledge that surfaces that reflect light the best are smooth, shiny and flat.)



Recognise that light from the sun can be dangerous and that there are different ways to protect their eyes (knowledge that the pupils control the amount of light entering the eyes and that if too much light enters it can damage the retina.)

Recognise that shadows are formed when the light from a light source is blocked by the opaque object (knowledge that a shadow is created when light is blocked by an opaque object – a shadow is larger when an object is closer to a light source as it blocks more of the light.)

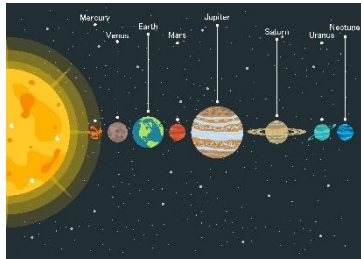
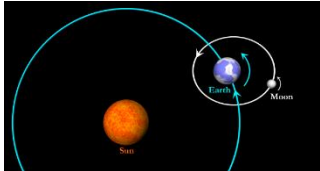
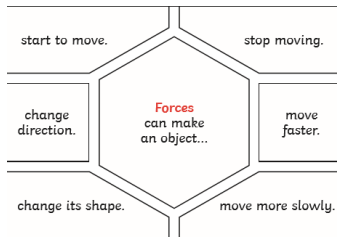
Find patterns in the way that the size of shadows changes (knowledge of when a light source is directly above an object – midday, the shadow will be directly underneath whereas when a light source is to one side of an object the shadow will appear longer on the other side (e.g. sunset)

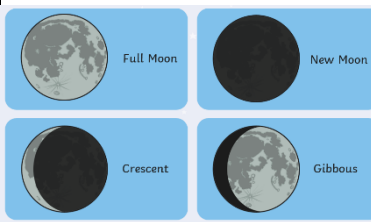
Vocabulary

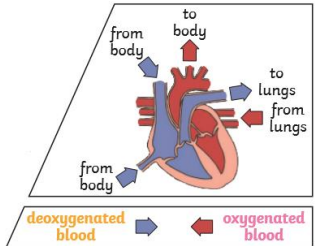
Light, light source, dark, reflection, reflect, reflective, ray, pupil, retina, shadow, opaque, translucent, transparent, surface, reflection, shiny, smooth

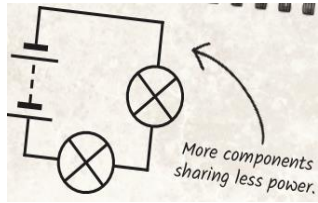
Skills to develop Scientific Enquiry

Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

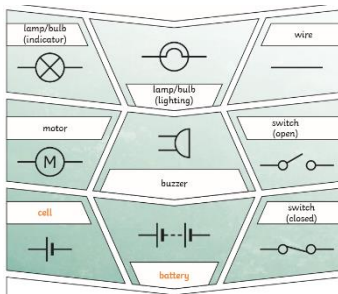
	<p>States of matter, solid, liquid, gas, water vapour, melt, freeze, heat, cool, evaporate, condensate, precipitation</p> <p><u>Skills to develop Scientific Enquiry</u> Exploring the effect of temperature on substance.</p> <p>Observe and record evaporation over a period of time.</p>	<p>added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.</p>	<p>Compare the teeth of carnivores and herbivores.</p> <p>Investigate what damages teeth.</p> <p>Illustrate and discuss ideas surrounding the digestive system.</p>			
<p>Year 5</p>	<p><b>Area of Science: Chemistry</b> <b>Strand: Materials and their Properties</b></p> <p><u>National Curriculum and Key Knowledge</u> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and responses to magnets (<b>knowledge that a conductor is a material which heat or electricity can easily travel through.</b>)</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (<b>Soluble materials are those which dissolve – disappear when mixing a solid and a liquid.</b>)</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (<b>knowledge of reversible changes including, evaporating, filtering, sieving, dissolving and melting. Recognising that melting and dissolving are different processes.</b>)</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (<b>knowledge that a fair test is when all variables are kept the same except the one being investigated</b>)</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes (<b>knowledge that dissolving and melting involve a solid being turned into a liquid which can be reversed through cooling and evaporation.</b>)</p> <p>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 (<b>knowledge that burning, heating and mixing are irreversible changes which cannot be changed back.</b>)</p> <p><u>Vocabulary</u> Conductor, insulator, transparency, sieving, filtering, dissolving, soluble, solution, particle Prior Vocab – evaporate, condensate, solid, liquid, gas, melt, freeze</p> <p><u>Skills to develop Scientific Enquiry</u> Carrying out tests to answer questions.</p> <p>Observe and compare the changes which take place in chemical changes.</p>	<p><b>Area of Science: Physics</b> <b>Strand: Earth and Space</b></p> <p><u>National Curriculum and Key Knowledge</u> Describe the movement of the Earth, and other planets, relative to the Sun in the Solar System (<b>knowledge that Earth rotates on an axis and travels around the Sun.</b>)</p>  <p>Describe the movement of the Moon relative to the Earth (<b>knowledge that the Moon orbits Earth and at various times in a month, appears to be different shapes this is as the Sun lights up different parts of it.</b>)</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies (<b>knowledge that the Earth orbits the Sun which takes 365 days and the Moon orbits Earth.</b>)</p>  <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky (<b>knowledge of how the Earth rotates on its axis. It does a full rotation every 24 hours. Daytime occurs when the side of the Earth is facing the Sun, whereas night</b></p>	<p><b>Area of Science: Physics</b> <b>Strand: Forces and Magnets</b></p> <p><u>National Curriculum and Key Knowledge</u> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (<b>knowledge that gravity acts on the Earth by pulling objects towards its centre.</b>)</p>  <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces (<b>knowledge that water resistance and air resistance are forms of friction caused by water or air pushing against a moving object.</b>)</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect (<b>knowledge that pulleys and levers make a small force lift a lighter load. Gears and cogs can be used to change the speed, force or direction of a motion.</b>)</p> <p><u>Vocabulary</u> Gravity, gravitational pull, weight, mass, air resistance, water resistance, buoyancy, streamlined, mechanism, friction, forces</p> <p><u>Skills to develop Scientific Enquiry</u> Carry out a fair test by designing and making a variety of parachutes to</p>	<p><b>Area of Science: Biology</b> <b>Strand: Animals inc. Humans</b></p> <p><u>National Curriculum and Key Knowledge</u> Describe the changes as humans develop to old age (<b>knowledge of the various stages of life – baby, child, adolescence – puberty, adulthood and old age.</b>)</p> <p><u>Vocabulary</u> Fertilisation, prenatal, gestation, reproduce, asexual reproduction, sexual reproduction, life cycle, infancy, childhood, adolescence, adulthood, elderly, menstruation, puberty, life expectancy</p> <p><u>Skills to develop Scientific Enquiry</u> Research the gestation periods of other animals.</p> <p>Find out and record the length and mass of a baby as it grows.</p>	<p><b>Area of Science: Biology</b> <b>Strand: Living things and their Habitats</b></p> <p><u>National Curriculum and Key Knowledge</u> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (<b>knowledge that insects, amphibians and birds lay eggs. Mammals carry an embryo.</b>)</p> <p>Describe the life process of reproduction in some plants and animals (<b>knowledge that plants contain males and female sex cells, humans contain either a male or female sex cell.</b>)</p> <p><u>Vocabulary</u> Pollination, metamorphosis, Prior Vocab: gestation, fertilise, asexual reproduction, sexual reproduction, life cycle, pollination, reproduction</p> <p><u>Skills to develop Scientific Enquiry</u> Observe and compare the life cycles of plants and animals in the local environment with others around the world</p> <p>Observe changes in an animal over a period of time (e.g. hatching and rearing chicks)</p>	

		<p>occurs when Earth is facing away from the Sun.)</p>  <p><u>Vocabulary</u> Sun, Star, Moon, Planet, Sphere, Spherical bodies, Satellite, orbit, rotate, axis, geocentric model, heliocentric model, astronomer, Solar System, Day, Night, Month, Year, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto – dwarf planet</p> <p><u>Skills to develop Scientific Enquiry</u> Comparing the time of day at different places on the Earth through internet links and direct communication.</p> <p>Create simple models of the Solar System.</p> <p>Construct simple shadow clocks and sundials – calibrated to show midday and the start and end of the school day.</p>	<p>determine which designs are most effective and why.</p> <p>Explore resistance in water by making and testing boats of different shapes.</p> <p>Design and make products that use levers, pulleys, gears and / or springs and explore their effects.</p>		
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<p>Year 6</p>	<p><b>Area of Science: Physics</b> <b>Strand: Electricity</b></p> <p><u>National Curriculum and Key Knowledge</u> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit <b>(knowledge that more batteries or a higher voltage create more power to flow through the circuit.)</b></p> <p>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>(knowledge that few batteries of lower voltage gives less power to the circuit. Adding more buzzers or bulbs means the power is shared between more components.)</b></p>	<p><b>Area of Science: Biology</b> <b>Strand: Animals inc. Humans</b></p> <p><u>National Curriculum and Key Knowledge</u> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood <b>(knowledge that blood vessels carry blood from the heart to the bodies tissues and organs and back again.)</b></p>  <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies</p>	<p><b>Area of Science: Biology</b> <b>Strand: Evolution and Inheritance</b></p> <p><u>National Curriculum and Key Knowledge</u> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago <b>(knowledge of fossils / rocks from previous learning in Y3 and how living things on Earth have changed over time)</b></p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents <b>(knowledge that characteristics are passed from parents to their offspring.)</b></p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution <b>(knowledge that variation in offspring over time could make an animal more / less able to survive in an environment)</b></p>	<p><b>Area of Science: Biology</b> <b>Strand: Living things and their Habitats</b></p> <p><u>National Curriculum and Key Knowledge</u> 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 <b>(knowledge that living things can be classified according to their characteristics.)</b></p> <p>Give reasons for classifying plants and animals based on specific characteristics <b>(knowledge of classifying living things into various groups and being able to discuss why they have been grouped in this way.)</b></p> <p><u>Vocabulary</u> Classification, crustaceans, arachnid, vertebrate, invertebrate, bird, micro-organism, bacteria, fungi, organism</p>	<p><b>Area of Science: Physics</b> <b>Strand: Light</b></p> <p><u>National Curriculum and Key Knowledge</u> Recognise that light appears to travel in straight lines <b>(knowledge that light waves travel in straight lines called rays or beams of light)</b></p> <p>Use the idea that light travels in straight line to explain that objects are seen because they give out or reflect light into the eye <b>(knowledge that light travels from a light source in a straight line and hits an object, the light ray is then reflected off the chair and travels in a straight line to the eye, enabling a person to see the object.)</b></p> <p>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 <b>(knowledge that when we look at object we actually see the light reflecting from the object rather than the object itself.)</b></p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them <b>(knowledge that a shadow is always the same shape as the</b></p>
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Use recognised symbols when representing a simple circuit in a diagram. **(Knowledge that these symbols can be used to create an electrical circuit diagram:**



Vocabulary

Circuit, symbol, cell, current, amps, voltage, resistance, electrons.

Previous Vocabulary – buzzer, switch,

Skills to develop Scientific Enquiry

Systematically identify the effect of changing one component at a time in a circuit.

Design and make a useful circuit – e.g. a set of traffic lights / a burglar alarm.

function **(knowledge that keeping healthy involves eating the correct nutrients and exercising regularly.)**

Describe the ways in which nutrients and water are transported within animals including humans **(knowledge that blood transports gases, nutrients and waste products around the body.)**

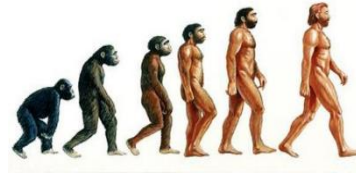
Vocabulary

Circulatory system, heart, blood cells, vessels, oxygenated blood, deoxygenated blood, drug alcohol, platelets, red blood cells, white blood cells, veins, plasma, organs

Previous vocabulary: pulse, nutrients

Skills to develop Scientific Enquiry

Research and explore the relationship between diet, exercise, drugs, lifestyle and health.



Vocabulary

Offspring, inheritance, variations, characteristics, adaptation, evolution, natural selection, fossil, adaptive traits, inherited traits, evolution

Prior vocabulary: habitats, environment

Skills to develop Scientific Enquiry

Explore local animals and how they are adapted to their environment.

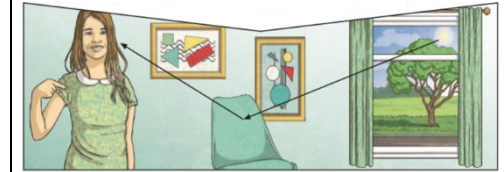
Compare how some living things are adapted to their environments.

Analyse the advantages and disadvantages of specific adaptations.

Skills to develop Scientific Enquiry  
Using classification systems and keys to identify some animals and plants within the environment.

Research unfamiliar animals and plants from a broad range of habitats.

object that casts it because when an opaque object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling.)



Vocabulary

Incident ray, reflected ray, the law of reflection, refraction, visible spectrum, prism, shadow, reflection, transparent, translucent, opaque, periscope

Skills to develop Scientific Enquiry

Design and create a periscope and using the idea that light appears to travel in straight lines, explain how it works.

Investigate the relationship between light sources, objects and shadows by using shadow puppets – extend the experience of light by looking at rainbows, colours on soap bubbles and objects looking bent in water.