



# Science Core Knowledge Progression Map

Subject: Science  
Knowledge Progression Map - KS1

Phase	Autumn -	Spring	Summer
Year A	<p><b>Physics: Seasonal Changes</b> (year long study) Children will:</p> <ul style="list-style-type: none"> <li>observe changes across the four seasons</li> <li>name the four seasons in order</li> <li>observe and describe weather associated with the seasons</li> <li>observe and describe how the day length varies</li> </ul> <p>They will know:</p> <ul style="list-style-type: none"> <li>Weather is the way the air and the atmosphere feels.</li> <li>It includes the outside temperature, strength of the wind, and whether it is raining, sunny, hailing, snowing, sleeting, foggy, or cloudy.</li> <li>The weather changes regularly and tends to be different during different seasons and across different countries.</li> <li>That as the seasons change so does our outside environment and what we wear.</li> <li>There are four seasons: Spring, Summer, Autumn and Winter.</li> <li>There are always 24 hours in a day.</li> <li>During winter there are less hours of daylight compared to a summer's day which has more.</li> </ul> <p><b>Biology: Animals including Humans</b> Children will:</p> <ul style="list-style-type: none"> <li>Identify living and non-living things</li> <li>Know the main parts of the human body including: head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth.</li> <li>Mammals: give birth to live young, usually have hair or fur, warm-blooded, cannot breathe underwater</li> <li>Some common mammals are: pets such as dogs, cats, hamsters; farm animals such as cows, sheep and horses; wild animals such as foxes, hedgehogs, lions and giraffes; humans</li> <li>Fish: have fins and scales, breathe underwater using gills, lay eggs in water, cold-blooded</li> <li>Some common fish are salmon, cod and tuna</li> <li>Birds: warm-blooded, have wings and beaks, have feathers, lay eggs</li> <li>Some common birds are ducks, chickens, penguins and pigeons</li> <li>Reptiles: cold-blooded, lay eggs, have scales, cannot breathe underwater,</li> <li>Some common reptiles are snakes and lizards</li> </ul>	<p><b>Physics: Seasonal Changes</b> (Year long study) Children will:</p> <ul style="list-style-type: none"> <li>observe changes across the four seasons</li> <li>name the four seasons in order</li> <li>observe and describe weather associated with the seasons</li> <li>observe and describe how the day length varies</li> </ul> <p>They will know:</p> <ul style="list-style-type: none"> <li>The weather changes regularly and tends to be different during different seasons and across different countries.</li> <li>That as the seasons change so does our outside environment and what we wear.</li> </ul> <p><b>Chemistry: Everyday Materials (1)</b> Children will know:</p> <ul style="list-style-type: none"> <li>distinguish between an object and the material from which it is made</li> <li>describe materials using their senses, using specific scientific words</li> <li>name some different everyday materials; for example wood, plastic, metal, water and rock</li> <li>explain what material objects are made from</li> <li>explain why a material might be useful for specific job</li> <li>sort materials into groups by giving criterion</li> <li>explain how solid shapes can be changed by squashing, bending, twisting and stretching</li> </ul> <p><b>Use of Everyday Materials (2):</b></p> <ul style="list-style-type: none"> <li>describe the simple physical properties of a variety of everyday materials</li> <li>compare and group together a variety of materials based on their simple physical properties</li> <li>explore how shapes of solid objects can be changed for example squashing, bending, twisting, stretching</li> <li>find out about people who developed useful new materials for example John Dunlop, Charles Macintosh, John McAdam</li> <li>identify and compare the suitability of a variety of everyday materials including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses</li> </ul>	<p><b>Physics: Seasonal Changes</b> (Year long study) Children will: observe changes across the four seasons</p> <ul style="list-style-type: none"> <li>name the four seasons in order</li> <li>observe and describe weather associated with the seasons</li> <li>observe and describe how the day length varies</li> </ul> <p>They will know:</p> <ul style="list-style-type: none"> <li>The weather changes regularly and tends to be different during different seasons and across different countries.</li> <li>That as the seasons change so does our outside environment and what we wear.</li> <li>During winter there are less hours of daylight compared to a summer's day which has more.</li> </ul> <p><b>Biology: Plants</b> Children will:</p> <ul style="list-style-type: none"> <li>Describe a name the petals, leaf, bulb, flower, seed, stem and roots, fruits of a plant</li> <li>identify and name a range of common plants and trees, dandelion daisy, clover, buttercup, nettle, oak, willow, poplar...</li> <li>name the trunk, branches and root of a tree</li> <li>Know deciduous trees lose their leaves in the autumn every year. Their leaves are generally broad, flat and have veins running through them. • Evergreen trees have green leaves all year round. Their leaves are generally thick, waxy and narrow like needles.</li> </ul>

	<ul style="list-style-type: none"> <li>• Amphibians: cold-blooded, lay eggs, live on land and water - can breathe underwater through gills</li> <li>• Some common amphibians are frogs and toads</li> <li>• Herbivores, carnivores and omnivores: herbivores are animals that feed on plants (e.g. horse, zebra, rabbit, deer); carnivores are animals that feed on other animals (e.g. lion, crocodile, shark); omnivores are animals that eats a variety of food - both plant and animal (e.g. humans, badgers, bears)</li> </ul>		
Key Vocabulary	<p><b>Physics: Seasonal Changes</b> weather (sunny, rainy, windy, snowy, etc) Seasons (winter, spring, summer, autumn) sun, sunrise, sunset, day length, monsoon, thunderstorm</p> <p><b>Biology: Animals including Humans</b> head, body, eyes, is, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, carnivores herbivores omnivores, pets, mammals, reptiles, amphibians, fish, insects, birds</p>	<p><b>Physics: Seasonal Changes</b> weather (sunny, rainy, windy, snowy, etc) Seasons (winter, spring, summer, autumn) sun, sunrise, sunset, day length, monsoon, thunderstorm</p> <p><b>Chemistry: Everyday Materials</b> object, material, wood, plastic, glass, metal, water, rock, paper, fabric, elastic, foil, card, cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks, tears, rough, smooth, shiny, see-through, not see through</p> <p><b>Chemistry: Use of Everyday Materials</b> opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, shape, push, pushing, pull, pulling, twist, twisting, squash, squashing, bend, bending, stretch, stretching</p>	<p><b>Physics: Seasonal Changes</b> weather (sunny, rainy, windy, snowy, etc) Seasons (winter, spring, summer, autumn) sun, sunrise, sunset, day length, monsoon, thunderstorm</p> <p><b>Biology: Plants</b> Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, deciduous, evergreen</p>
Year B	<p><b>Biology: Living things and their habitats</b> Children will:</p> <ul style="list-style-type: none"> <li>• match certain living things for habitats they are found in</li> <li>• explain the differences between living and non-living things</li> <li>• describe some of the Life Processes common to plants and animals including humans</li> <li>• describe how a habitat provides for the basic needs of the things living there</li> <li>• describe how some animals get their food using basic food chains</li> <li>• describe how plants and animals are suited to their habitat</li> <li>• A habitat is a place where living things, such as animals and plants, can find all of the things they need to survive. This includes food, water, air, space to move and grow and some shelter.</li> <li>• Some habitats are large, like the ocean, and some are very small, such as under a log.</li> <li>• Some habitats in our local area include the river, the coast and woodlands.</li> <li>• Microhabitats are very small habitats where minibeasts may live. Examples of microhabitats include under stones, in grass, under fallen leaves and in the soil</li> <li>• Minibeasts that can be found there include worms, snails, ants, centipedes, millipedes, and butterflies and they help to keep the microhabitat healthy.</li> <li>• Minibeasts are able to survive in their habitats because they can find the things they need to survive there, such as food and water. For example, caterpillars can survive on leaves as they give them food.</li> </ul>	<p><b>Biology: Animals including humans (links to PSHE)</b> Children will learn:</p> <ul style="list-style-type: none"> <li>• explain the animals grow and reproduce</li> <li>• explain why animals have offspring which grow into adults</li> <li>• describe the life cycle of some living things (EG egg, chick, chicken)</li> <li>• explain the basic needs of animals, including humans for survival (water, food, air)</li> <li>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> <li>• A life cycle is the series of changes that an animal or plant passes through from the beginning of its life until its death. • Animals, including humans, have offspring which grow into adults</li> <li>• All animals need water, air, food and shelter to survive.</li> <li>• Some animals are wild and can find sustenance themselves.</li> <li>• Some animals are looked after and so we need to provide them with sustenance and shelter</li> <li>• To keep healthy, humans need: To eat a balanced diet and healthy food (the eat well plate) and what good portion sizes are; To limit the amount of sugars and fats in our diet; Some exercise to keep their muscles and bones healthy; To take medicines that are given to them by doctors and nurses when feeling poorly; To keep good hygiene by washing regularly, having clean clothes, brushing teeth and hair</li> </ul>	<p><b>Biology: Plants</b> Children will learn:</p> <ul style="list-style-type: none"> <li>• observe and describe how seeds and bulbs grow into mature plants</li> <li>• Investigate and describe the impact of removing light, soil or water from a growing or germinating plant</li> <li>• What plants need to grow: water, a sustainable temperature, nutrients from soil and light to grow and stay healthy.</li> <li>• When a plant grows it is called germination.</li> <li>• Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a food store inside of them.</li> <li>• Plants can: move, grow, sense (react to their surroundings), absorb nutrients, reproduce.</li> </ul>

	<ul style="list-style-type: none"> <li>Animals and plants depend on each other to survive. For example, worms depend on plants because they feed on dead leaves, but plants depend on worms who make the soil healthy by digging holes and allowing air in. Birds also need worms because they eat them. Worms are a source of food for birds. This called a food chain. If there were no worms, there would be fewer birds as there would be more competition for food. The soil would not be as healthy without worms.</li> <li>All living things (or things that were once living) have a part to play in food chains. Without them, other animals and plants may not be able to survive.</li> </ul>		
Key Vocabulary	<b>Biology: Living things and their habitats</b> Living, Dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats for example pond, Woodlands, names of micro-habitats for example under logs, in bushes, lifecycle, carnivores, omnivore, survive, nutrition,	<b>Biology: Animals including humans</b> offspring, reproduction (all things reproduce not the process), growth, child, young and old stages (examples chick/hen, baby/child/adult, caterpillar/butterfly), Exercise, heartbeat, breathing, hygiene, germs, disease, food types (meat fish vegetables, bread, rice, pasta)	<b>Biology: Plants</b> light, shade, sun, warm, cool, water, grow, healthy, germinate

Subject: Knowledge Progression Map - LKS2			
Phase	Autumn -	Spring	Summer
Year A	<b>Biology: Animals including humans 3</b> Children will: <ul style="list-style-type: none"> <li>explain the importance of a nutritionally balanced diet</li> <li>describe how nutrients, water and oxygen are transported within animals and humans</li> <li>identify that animals including humans cannot make their own food; they get nutrition from what they eat</li> <li>Describe and explain the skeletal system of a human</li> <li>Describe and explain the muscular system of a human</li> </ul> <ul style="list-style-type: none"> <li>Animals get nutrition from what they eat</li> <li>There are 6 essential nutrients that the body needs to function properly: carbohydrates, fats, proteins, vitamins, minerals, water</li> <li>Nutrients are compounds in foods essential to life and health, providing us with energy and the building blocks for repair and growth.</li> <li>Animals cannot make their own food</li> <li>Animals need a balance of the right type of nutrients</li> <li>Animals can be grouped by their diet</li> <li>Skeletons provide support and protection</li> <li>Muscles enable us to move. Muscles work by pulling.</li> <li>Humans and some other animals have endoskeletons</li> <li>Some animals have exoskeletons for protection</li> <li>Ball and socket, hinge and gliding joints allow bones to move in different ways</li> </ul>	<b>Biology: Animals including humans 4</b> Children will: <ul style="list-style-type: none"> <li>identify, name and describe the functions of the basic parts of the digestive system in humans</li> <li>identify the simple functions of different types of teeth in humans</li> <li>compare the teeth of herbivores and carnivores</li> <li>identify common construct and interpret a variety of food chains identifying producers, predators and prey</li> </ul> <p>Humans have a digestive system that allows them to digest food. It is the system of organs that get food in and out of the body and which make use of the food to keep the body healthy.</p> <ul style="list-style-type: none"> <li>It is comprised of: • Salivary glands, mouth, teeth, tongue, oesophagus, stomach, liver, gallbladder, pancreas, duodenum, small intestine, large intestine, rectum, anus.</li> </ul> <p>The function of each part of the digestive system • Salivary glands: The smell of food triggers the salivary glands to produce saliva . Saliva is mostly made of water and it helps you to chew, taste and swallow food. Contains enzymes which start to break down the food we eat.</p> <ul style="list-style-type: none"> <li>Mouth: Entry point for food. Where saliva mixes with food.</li> </ul> <p>Location of tongue and teeth. Top part of the mouth (soft palate) helps move food along to the oesophagus.</p> <ul style="list-style-type: none"> <li>Teeth: Tear, cut and grind food into smaller pieces.</li> <li>Tongue: Helps mix the food and saliva.</li> </ul> <p>Oesophagus: A muscular tube which forms the path from the mouth to the stomach. Muscles contract and relax to move food down the oesophagus to the stomach. • Stomach: Glands line the stomach produce acid and enzymes which breaks the food down further. Muscles in the stomach mix the food. • Liver:</p>	<b>Physics: Light</b> Children will: <ul style="list-style-type: none"> <li>recognise that they need light in order to see things</li> <li>recognise 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 there are ways to protect their eyes</li> <li>recognise that shadows are formed when the light from a source is blocked by a solid object</li> <li>find patterns in the way that the size of shadows change</li> <li>explain the difference between transparent, translucent and opaque</li> </ul> <p>A light source is something that emits light by burning, electricity or chemical reactions. • Burning light sources include the Sun, flames from a fire and stars. • Electric lights include lamps, car headlights and street light.</p> <p>The sun is very bright and contains UV rays (ultra violet).</p> <ul style="list-style-type: none"> <li>UV rays can damage and burn our skin. • We can protect ourselves from the sun by wearing a hat, clothes to cover our skin and by using a sun cream with a high UV rating (spf50 or higher)</li> <li>Sunlight and UV rays can damage our eyes</li> <li>We need light so that we are able to see in the dark.</li> <li>The Moon is not a source of light because the Sun's light reflects on the surface of the Moon making it appear as though the Moon emits light.</li> <li>Shiny things are not light sources – they are reflective.</li> <li>Light travels in straight lines.</li> <li>When light is blocked by an opaque object, a dark shadow is formed. An opaque material blocks light</li> </ul>

Produces bile which helps to absorb fats. Bile is sent to the gallbladder to be stored. • Gallbladder: Releases bile into the duodenum when needed. • Pancreas: Produces enzymes to break down fats, proteins and carbohydrates. Releases them into the duodenum. • Duodenum: Produces enzymes to break down fats, proteins and carbohydrates. Releases them into the duodenum. • Small intestine: The other parts of the small intestine – (jejunum and ileum) absorb nutrients from the food. Pass any leftover broken down food to the large intestine. • Large intestine: Connects the small intestine to the rectum. • Absorbs water from waste food. • Forms stool from waste food. • Rectum: Stores stool passed to it from the large intestine. • Makes brain aware of need to go to the toilet. • Anus: Releases the stool. End of the digestive process.

What are the different types of teeth in humans and what are their functions?

• Incisors: Humans have 8 incisors altogether; 4 in the upper jaw and 4 in the lower jaw. Incisors are shovel-shaped. Used for biting and cutting food. • Canines: Humans have 4 canine teeth, one in each quarter of the mouth, on either side of the incisors. Used for tearing and ripping food. Holding and crushing food. • Premolars: Humans have 8 premolars, two in each quarter of the mouth. They are between the canine tooth and the molars. • Molars: Humans have 8 molars, two in each quarter of the mouth. They are at the back of the mouth behind the premolars. Large and flat. Grinding food. • Wisdom Teeth: Humans can have up to 4 wisdom teeth, There is 1 in each quarter of the mouth behind the molars. Large and flat (they are just a third molar)

What is a food chain? What are producers, predators and prey?

• A food web is a series of organisms related by predator-prey and consumer-resource interactions; the entirety of interrelated food chains in an ecological community. • Producers: An organism, as a plant, that is able to produce its own food from inorganic substances. • Predators: Any organism that exists by preying upon other organisms. • Prey: An animal hunted or seized for food, especially by a carnivorous animal

#### **Physics: Rocks;**

Children will:

- compare and group together different rocks on the basis of their appearance and simple physical properties
- describe and explain how different rocks can be useful to us
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- describe and explain the differences between sedimentary and igneous rocks considering the way they are formed
- recognise that soils are made from rocks and organic matter
  - Rocks are classified by the process in which they are formed. Igneous Rocks are formed from magma or lava once it has cooled. Sedimentary Rocks are rocks formed from layers of sediment which are then crushed under the pressure of yet more layers. Metamorphic Rocks are rocks formed when one type of rock is changed into another type by pressure and heat.
  - There are two main types of fossil: Body fossils are the

• When light is shone onto a transparent object, the light travels through it, we can see through it and it makes a very faint shadow.

• When light is shone onto a translucent object, some of the light travels through it, we can see bright light sources through it and it makes a fairly dark shadow.

• The size of a shadow changes as the light source moves. The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow

#### **Physics: Forces & Magnets**

Children will:

- compare how things move on different surfaces
- observed that magnetic forces can be transmitted without direct contact
- observe how some magnets attract or repel each other
- identify and classify which everyday materials are attracted to magnets and which are not
- notice that some forces need contact between two objects but magnetic forces can act as a distance
- Describe magnets as having two poles, North and South, and predict where the two magnets will attract or repel each other depending on which poles are facing
- make and record a prediction before testing

• Forces are pushes and pulls. • These forces change the motion of an object. • They will make it start to move or speed up, slow it down or even make it stop.

Forces act in opposite directions to each other.

• Friction is a force that holds back the motion of an object.

• Some surfaces create more friction than others which means that objects move across them slower.

• The force that causes the object to move downwards is gravity.

Magnets produce an area of force around them called a magnetic field.

• When magnets repel, they push each other away

• When magnets attract, they pull together

Objects that are magnetic, are attracted to • magnets. • Iron and steel are magnetic. • Aluminium and copper are non-magnetic

The ends of a magnet are called poles. • One end is called the north pole and the other end is called the south pole. • Opposite poles attract, similar poles repel.

		<p>fossilised remains of a plant or animal Trace fossils are fossilised records of an animal's behaviour, for example a footprint.</p> <ul style="list-style-type: none"> <li>Fossils are made by <ul style="list-style-type: none"> <li>An animal skeleton or trace is buried under small particles of rock, called sediment.</li> <li>As more layers of sediment build up on top, the sediment around the object begins to compact and turn to rock.</li> <li>As water seeps through the sedimentary rock, any bones or organic matter are dissolved gradually.</li> <li>Minerals in the water replace the bone or organic matter, leaving a rock replica of the original. This is called a fossil.</li> </ul> </li> <li>Weathering and erosion may eventually expose the fossil</li> <li>Soil <ul style="list-style-type: none"> <li>Soil forms less than 10% of land</li> <li>Soil contains the water and nutrients needed for plants to grow.</li> <li>Soil can be damaged by erosion and pollution.</li> </ul> </li> </ul>	
Key Vocabulary	<p><b>Biology: Animals including humans 3</b>  nutrition, nutrients, carbohydrates, sugars, protein, vitamins minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, comma, spine, muscles, joints</p>	<p><b>Biology: Animals including humans 4</b>  digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum karna anus, incisor, canine, molar,, herbivore carnivore omnivore, producer, predator, prey, foodchain.</p> <p><b>Physics: Rocks;</b>  rock, stone, pebble, boulder, comma, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy soil, chalky soil, clay soil</p>	<p><b>Physics: Light</b>  light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous</p> <p><b>Physics: Forces &amp; Magnets</b>  Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north Pole, south Pole</p>
Year B	<p><b>Biology: Living things and their habitats,</b> Children will:</p> <ul style="list-style-type: none"> <li>recognise that living things can be grouped in a variety of ways</li> <li>classify and identify into broad groups</li> <li>explore and use a classification key to group, identify and name a variety of living things for example plants, vertebrates, invertebrates</li> <li>recognise that environments can change and this can sometimes pose a danger to living things</li> <li>explain how environmental changes have an impact on living things</li> </ul> <p>All living things, which can also be called organisms, have to do certain things to stay alive. These are the life 7 processes: o movement o respiration o sensitivity o growth o reproduction o excretion o nutrition</p> <ul style="list-style-type: none"> <li>Living things can be grouped according to different criteria (where they live, what type of organism they are, what features they have). For example, a camel can belong in a group of vertebrates, a group of animals that live in the desert, and a group of animals that have four legs.</li> </ul> <p>Habitats can change throughout the year and this can have an effect on the plants and animals that live there.</p> <ul style="list-style-type: none"> <li>Humans can have positive and negative effects on the environment: <ul style="list-style-type: none"> <li>positive effects: nature reserves, ecological parks</li> <li>negative effects: litter, urban development</li> </ul> </li> </ul> <p><b>Physics: Sound</b>  Children will:</p> <ul style="list-style-type: none"> <li>describe a range of sounds and explain how they are made</li> </ul>	<p><b>Physics: States of Matter</b>  Children will:</p> <ul style="list-style-type: none"> <li>compare and group materials together according to whether they are solids, liquids or gases</li> <li>measure or research the temperature at which different materials change state in degrees Celsius</li> <li>use measurements to explain changes to the state of water</li> <li>Objects are composed of a material in one of three states of matter: solid, liquid or gas</li> <li>Objects are made of particles (tiny building blocks) and that these are organised differently in different states</li> <li>Materials can change state when temperature changes</li> <li>When solids turn into liquids, this is called melting and the reverse process is called freezing</li> <li>When liquids turn into gases, this is called evaporation and the reverse process is called condensation</li> <li>When a solid turns into a gas without passing through the liquid state, this is called sublimation</li> <li>The melting point of water is 0C and the boiling point 100C</li> <li>Water flows around our world in a continuous process called the water cycle</li> <li>Along with evaporation, water on the Earth's surface moves to the air in a process called transpiration, where water turns into water vapour (gas) on the surface of leaves on plants There are bonds between particles in a solid; as temperature increases, these bonds are partially overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature</li> </ul>	<p><b>Physics: Electricity</b>  Children will:</p> <ul style="list-style-type: none"> <li>identify common appliances that run on electricity</li> <li>construct a simple series electric circuit</li> <li>identify and name the basic part in a series of circuit comma including cells, wires, bulbs, switches and buzzers</li> <li>recognise symbols to represent simple series circuit diagrams</li> <li>identify whether or not a lamp with 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</li> <li>associate a switch opening with whether or not a lamp lights in a simple series circuit</li> <li>recognise some common conductors and insulators</li> <li>associate metals with being good conductors</li> </ul> <ul style="list-style-type: none"> <li>Electricity is a form of energy.</li> <li>Some appliances use batteries and some use mains electricity. A complete circuit is a loop that allows electrical current to flow through wires.</li> <li>A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer).</li> <li>The electrical current flows through the wires from the battery (cell) to the lamp, motor or buzzer).</li> <li>A switch can break or reconnect a circuit.</li> <li>A switch controls the flow of the electrical current around the circuit.</li> </ul>

	<ul style="list-style-type: none"> <li>• associate some sounds with something vibrating</li> <li>• compare sources of sound and explain how the sounds differ</li> <li>• explain how to change a sound e.g louder, softer</li> <li>• recognise how vibrations from sound travel through a medium to an ear</li> <li>• describe the relationship between the pitch of the sound and the features of its source or object that produces it</li> <li>• find patterns between the volume of the sound and the strength of the vibrations that produced it, and the distance of the source</li> <li>• investigate how different materials can affect the pitch and volume to sounds <ul style="list-style-type: none"> <li>• Sound is the movement of energy through objects or substances in longitudinal waves. A thing that can be heard. The object that makes the sound is called the source.</li> <li>• When objects vibrate, a sound is made. • The vibration makes the air around the object vibrate and the air vibrations enter your ear. • These are called sound waves. • If an object is making a sound, a part of it is vibrating, even if you cannot see the vibrations • The energy is transferred through the substance in a wave.</li> <li>• Sound waves travel through a medium (such as air, water, glass, stone, and brick).</li> <li>• Pitch: The pitch of a sound is how high or low it is.</li> <li>• Volume: The volume of a sound is how loud or quiet it is. <ul style="list-style-type: none"> <li>o When a sound is created by a little amount of energy, a weak sound wave is created which doesn't travel far. This makes a quiet sound. • A vibration with lots of energy makes a powerful sound wave and therefore a loud sound.</li> <li>• Decibels measure how loud a sound is.</li> </ul> </li> </ul> </li> </ul>	<p>the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas</p> <p><b>Biology: Plants</b></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) • Roots attach the plant and provide water and nourishment • The stem/trunk is the main body • Water is transported from the roots, through the tubes in the stem, to the tip of the plant • Leaves turn energy from the sun into food. • The sepal and pistil are the male and female parts of the plant used in reproduction</li> <li>• Explore the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow) Plants require: water, a sustainable temperature, nutrients from soil and light to grow and stay healthy • Plant growth will be affected by the conditions in which it is placed</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. Most plants need pollen or spores to make new plants</li> <li>• pollination is the process of moving pollen onto the pistil • pollinators, such as honey bees, move pollen from one flower to another • fertilisation is when pollen combines with the egg inside of the pistil to make a seed • seeds can be dispersed in various ways (by: wind, animals including humans, water, bursting)</li> </ul>	<ul style="list-style-type: none"> <li>• Objects that are made from materials that allow electricity to pass through create a complete circuit are called electrical conductors.</li> <li>• Objects that are made from materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators</li> </ul>
Key Vocabulary	<p><b>Biology: Living things and their habitats,</b> classification, classification keys, environment, habitats, human impact, positive, negative, migrate, hibernate</p> <p><b>Physics: Sound</b> Sound, source, vibrate, vibration, travel, pitch, high-pitched low pitched volume, faint, loud, insulation</p>	<p><b>Physics: States of Matter</b> solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle Precipitation,</p> <p><b>Biology: Plants</b> photosynthesis, colon, insect pollination, wind pollination, seed formation, seed dispersal, wind dispersal, animal dispersal, water dispersal,</p>	<p><b>Physics: Electricity</b> electricity, electrical appliance electrical device, mains, plug, electrical circuit, complete circuit, component, cell, battery positive and negative, connect comic connections, loose connection, short-circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol</p>

Subject: Knowledge Progression Map - UKS2			
Phase	Autumn -	Spring	Summer
Year A	<p><b>Physics: Earth &amp; Space</b> Children will:</p> <ul style="list-style-type: none"> <li>• identify and explain the movement of the Earth and other planets relative to the sun in the solar system</li> <li>• explain how seasons and the associated weather is created</li> <li>• describe and explain the movement of the Moon relative to the Earth</li> </ul>	<p><b>Physics: Forces;</b> Children will:</p> <ul style="list-style-type: none"> <li>• explain unsupported objects fall towards the Earth because 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 between moving surfaces</li> </ul>	<p><b>Animals including humans 5 &amp; 6</b> Children will:</p> <ul style="list-style-type: none"> <li>• Compare and describe the stages of humans development: baby, toddler, child, adolescent, adult and adult in old age and know features related to each stage of development. Baby (under 1 year) • Toddler (1 – 3 years old) • Child (4-10 years) Adolescent ( 11-20 years) • Adult (20-60) Old age (60+) • Muscles grow weaker • Skin</li> </ul>

- describe the sun, Earth and Moon as approximately spherical bodies
  - use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky
- The Earth rotates on its axis anti-clockwise and makes a complete rotation over 24 hours (a day). • This makes it appear as the Sun moves through the sky but the Earth's rotation causes day and night. • Different parts of the Earth experience daylight at different times - this means that it is morning, afternoon and night in different places. This is also the reason why we have time zones. • Because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. • As the Earth rotates, shadows that are formed change in size and orientation. The Earth takes 365 and a quarter days to orbit the Sun. • Because of the extra quarter day it takes to orbit the Sun, every four years on Earth is a leap year!

• It is the Earth's tilt that causes the seasons.

The Moon orbits the Earth anticlockwise and takes approximately 28 days. • The Moon spins once on its axis every time it orbits Earth. This means that we only see one side of the Moon. • The Moon has different phases depending on where it is in its orbit. • The Moon's gravity causes high and low tides.

There are 8 planets in our Solar System (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune). Pluto is a dwarf planet. • They all orbit the Sun, which is a star, and they all have moons. • Theories have changed over the years, and early astronomers believed that the earth

was at the centre of the solar system. Consider the work of astronomers such as Ptolemy, Alhazen, Copernicus. • The first four planets are relatively small and rocky, while the four outer planets are gas giants (Jupiter and Saturn) or ice giants (Uranus and Neptune). • There are also asteroids, meteoroids and comets in the Solar System. • The solar systems is in a galaxy called the Milky Way. • The galaxy is in the universe.

#### **Investigation Unit: Chemistry & Biology: Water diseases**

Children will:

Identify what pH is and how it is measured

- Explain the importance of having a clean and safe water source
- Understand the process of osmosis
- Identify the names of a variety of waterborne diseases and how they affect people

Identify and explain an effective method of reducing the spread of waterborne diseases

- Use fair testing to investigate the pH of every liquids and explain the effects on the human body and the environment e.g. testing the effects of bleach on surfaces

Working scientifically

- Plan a fair test to investigate the pH of different water sources
- Ask relevant questions and research the effects waterborne diseases have on the human body

- Measure and record the pH of a variety of liquids and record the result on a graph

- Label and classify a variety of liquids in accordance with the pH

- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller Force to have a greater effect
- Uplthrust is the force acting upwards on an object in water.
- Water resistance is a type of friction, which is a force
- Gears are wheels with teeth that fit together. When one gear moves, the other moves in the opposite way. A larger gear can turn a smaller gear faster with less force.
- Levers can change the direction of a force or magnify it (make it bigger). Examples: our joints, scissors and bottle openers.
- A pulley is a wheel fixed at one end with a rope passing through it. A single wheel pulley helps reverse the direction of the lifting force. A two wheel pulley reduces the force needed to lift an object

#### **Biology: Evolution and inheritance**

Children will:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- use basic ideas of inheritance, variation and adaptation to describe how living things have changed over time
- explain the process of evolution and describe the evidence for this
- identify how animals and plants are adapted to suit their environment in different ways and adaptation may lead to evolution
- Australopithecus • lived between about 3.8 and 3 million years ago. •Homo Habilis • first species of humans. • 'Homo Habilis' means handy man because they had the ability to think. • lived between 2.4 and 1.4 million years ago. • Homo Erectus • lived about 1.2 million years ago. • 'Homo Erectus' means upright man. • first humans to only ever walk on 2 feet. • Homo Neanderthals • lived about 200,000 to 35,000 years ago. • The size of their brains suggest that they were very intelligent. • used flint to make tools with. • They lived during the Ice Ages when they hunted deer, ox, reindeer and mammoth. Homo Sapiens • 'Homo Sapiens' means wise man. • Homo Sapiens evolved about 200,000 years ago and still live today. • You are a Homo Sapien.
- Homo Sapiens have a large brain and this makes them incredibly intelligent. • Homo Sapiens have learnt a lot for their ancestors the Homo Erectus. • Homo Sapiens have developed other forms of communication other than just verbal.
- Inheritance refers to the genes that are passed on from parents to offspring.
- The majority of living things are the result of sexual reproduction so they have two parents. You inherit the characteristics from both parents but the way they combine makes the offspring unique.
- Over many generations, a species will adapt to its environment because the animals with the most

- stretches and becomes wrinkled • Hair turns white or grey, some men go bald
- Know how their own bodies will change as they go through puberty (may be covered in PSHE)
- The circulatory system is made of the heart, lungs and the blood vessels. • Arteries carry oxygenated blood from the heart to the rest of the body. • Veins carry deoxygenated blood from the body to the heart. • Nutrients, oxygen and carbon dioxide are exchanged via the capillaries. • The heart is composed of four chambers: the right atrium, right ventricle, left atrium and left ventricle. • If you were to lay out all of the arteries, capillaries and veins in one adult, end-to-end, they would stretch about 60,000 miles (100,000 kilometres)
- Some choices, such as smoking and drinking alcohol can be harmful to our health. • Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and loss of taste and long-term effects such as lung disease, cancer and death. • Alcohol can cause short-term effects such as addiction and loss of control and longterm effects such as organ damage, cancer and death
- Nutrients are absorbed into the blood in the small intestine. • There are tiny hair-like villi that help this process happen. • The nutrients are carried in the blood to the different parts of the body that need them

		<p>successful characteristics are more likely to survive and pass on these characteristics to their offspring • Know how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.</p>	
<p>Key Vocabulary</p>	<p><b>Physics: Earth &amp; Space</b>  Earth, sun, moon, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system rotates, star, orbit,  <b>Study Unit: Chemistry &amp; Biology:</b>  pH, pH scale, Acidic, Alkaline, Basic, Neutral, Litmus, Waterborne, water sources  Health, sanitation, diseases, Names of diseases: E.coli, Malaria, Cholera, Typhoid  Fever, Giardia, Leptospirosis, Botulism  Unsanitary, Anomalous, Variables  Fair test, Samples, Investigation</p>	<p><b>Physics: Forces;</b> Force, gravity, earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears  <b>Biology: Evolution and inheritance</b>  offspring, sexual reproduction, very, characteristics, suited, adapted, environment, inherited, species, fossils, evolve,</p>	<p><b>Animals including humans 5 &amp; 6</b>  heart, pulse rate, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and Lifestyle</p>
<p>Year B</p>	<p><b>Biology: Living things &amp; their habitats 5 &amp; 6</b>  Children will:</p> <ul style="list-style-type: none"> <li>describe the differences in life cycles of a mammal, an amphibian, an insect and a bird</li> <li>identify the reproductive processes of some animals</li> <li>describe the life cycles of common plants</li> <li>explore the work of well-known naturalists and animal behaviourists for example David Attenborough and Jane Goodall</li> </ul> <p>Children will:</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>Biology: Plants</b></p> <ul style="list-style-type: none"> <li>describe the life process of reproduction in some plants and animals</li> </ul> <p>Reproduction is when an animal or plant produces one or more individuals similar to itself:</p> <ul style="list-style-type: none"> <li>Sexual reproduction: o requires two parents with male and female gametes (cells) o will produce offspring that is similar to but not identical to the parent</li> <li>Asexual reproduction: o will produce offspring that is identical to the parent o requires only one parent</li> </ul> <p>Plants reproduce: • Male gametes can be found in the pollen. • Female gametes can be found in the ovary (they are called ovules). • Pollination occurs when pollen from the anther is transferred to the stigma by bees and other insects. • The pollen then travels down and meets the ovules. When this happens, seeds are formed. This is called fertilisation. • Seeds are then dispersed so that germination can begin again.  Some plants such as daffodils and potatoes, can also produce offspring using asexual reproduction</p> <ul style="list-style-type: none"> <li>The life cycles of mammals, birds, amphibians and insects have similarities and differences. • One difference is that amphibians and insects go through the process of</li> </ul>	<p><b>Physics: Light</b>  Children will:</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 the objects are seeing because they give out or reflect light in the eye</li> <li>explain that we see things because light travels from light sources to her 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> <li>Explain how different colours of light can be created</li> </ul> <p><b>Physics: Electricity</b>  Children will:</p> <ul style="list-style-type: none"> <li>identify and name the basic parts of a simple electric series circuit (cells, wires,, switches, buzzers)</li> <li>compare and give reasons for variations in how components function including the brightness of bulbs, the loudness of buzzers, that on/off positions of switches</li> <li>Use recognised symbols when representing a simple circuit in a diagram and that symbols allow for universal identification.</li> <li>The actual layout of the components is usually quite different from the circuit diagram.</li> <li>Adding more batteries increases voltage, therefore making bulbs brighter, buzzers louder and motors move faster.</li> <li>Using batteries with a higher voltage increases energy supply, thus making bulbs, buzzers or motors, brighter, louder or faster.</li> <li>Through varying components, different results can be achieved, such as: adding more buzzers, bulbs or motors would result in dimmer, quieter or slower components; altering wire length affects the brightness, sound or speed, of bulbs, buzzers and motors; varying the position/composition of switch affects the function of the circuit.</li> <li>A simple loop with all bulbs/ motors connected in line (in</li> </ul>	<p><b>Chemistry: Properties and Changes of Materials</b>  Children will:</p> <ul style="list-style-type: none"> <li>compare and group together everyday materials on the basis of their properties including hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets</li> <li>explain how some materials dissolve in liquid to form a solution</li> <li>explain what happens when dissolving occurs</li> <li>use their knowledge of solids, liquids and gases to decide and describe how mixtures might be separated including through filtering, sieving, evaporating</li> <li>give reasons based on evidence for comparative and fair tests for particular uses of everyday materials including metals, wood and plastic</li> <li>describe changes using scientific words (for example evaporation condensation)</li> <li>demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials as this kind of change is not usually reversible including changes associated with burning and the action of acid on bicarbonate of soda</li> <li>use the terms 'reversible' and 'irreversible'</li> </ul>

	<p>metamorphosis. This is when the structure of their bodies changes significantly as they grow (for example, from tadpole to frog or caterpillar to butterfly).</p> <ul style="list-style-type: none"> <li>• Key features to distinguish between animals: Invertebrate or Vertebrate Mammal/Reptile/Fish/Amphibian/ Bird/insects/arachnids/annelids/molluscs/crustaceans/ech inoderms; Colour; Length; Number of legs; Number of body segments; Distinguishing features; Habitat</li> <li>• Key features to distinguish between plants: Flowering or Non-Flowering; Grass/cereal/garden shrub/deciduous/algae/coniferous /fern; Colour; Height; Number of flowers; Fruit bearing or not; Distinguishing features; Usual location</li> <li>• Microorganisms: are very tiny living things. Microorganisms can be found all around us. They can live on and in our bodies, in the air, in water and on the objects around us. They can be found in almost every habitat on Earth.</li> <li>• Scientists sort and group living things according to their similarities and differences. This is called classification. Scientists who classify living things are called taxonomists.</li> <li>• Carl Linnaeus: oBorn in Sweden on 23rd May 1707 oA leading light in the field of Taxonomy oFamous for developing the first system to classify animals effectively.</li> </ul>	<p>series) is called a Series Circuit.</p> <ul style="list-style-type: none"> <li>• Two loops, both connected to the battery, each with its own bulb/ motor is called a Parallel Circuit.</li> </ul>	
Key Vocabulary	<p><b>Biology: Living things &amp; their habitats 5 &amp; 6</b>  lifecycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and nonflowering  <b>Biology: Plants</b>  reproduction, sexual, asexual, plantlets, cuttings</p>	<p><b>Physics: Light</b>  straight lines, light rays, light sources,  <b>Physics: Electricity</b>  circuit, complete circuit, circuit diagram, cell, battery, comma comma, switch, voltage, (children do not need to understand what voltage is but will use volts and voltage describe different batteries the word cells and batteries are now used interchangeably</p>	<p><b>Chemistry: Properties and Changes of Materials</b>  reversible change, burning, rusting, new material</p>