



# Science Long Term Plan – Scientific Knowledge

**Crawford Village**  
Primary School & Nursery

Science Strand				
Class 1 EYFS Annual Cycle	<b>BIOLOGY</b>	<p><b><u>PLANTS AND ANIMALS INCLUDING HUMANS</u></b></p> <p>Explore the natural world around them, making observations and drawing pictures of animals (including humans) and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p>	<p><b><u>PLANTS – VOCABULARY</u></b> Tree, petals, trunk, fruit, branch, roots, leaves, bulb, flowers, seed, stem, water, environment</p> <p><b><u>ANIMALS INCLUDING HUMANS - VOCABULARY</u></b> Herbivore, face, carnivore, hair, omnivore, leg, human, knee, animal, arm, fish, elbow, birds, back, head, toes, ear, hands, eye, fingers, mouth, nose</p>	
	<b>CHEMISTRY</b>	<p><b><u>EVERYDAY MATERIALS</u></b></p> <p>Describe what they see, hear and feel whilst outside.</p>	<p><b><u>EVERYDAY MATERIALS - VOCABULARY</u></b> Material, metal, wood, rock, plastic, hard, glass, soft, paper, fabric, material, smooth, shiny, rough</p>	
	<b>PHYSICS</b>	<p><b><u>SEASONAL CHANGES</u></b></p> <p>Understand some important processes and changes in the natural world around them, including the seasons, changing states of matter, earth &amp; space and forces.</p>	<p><b><u>SEASONAL CHANGES - VOCABULARY</u></b> Autumn, Spring, Summer, Winter, weather, light, dark, sun, season, day</p> <p><b><u>EARTH &amp; SPACE</u></b> Earth, Moon, Planet, Space, Sun, Star</p>	
		<b>Cycle A</b> <b>2022 - 2023</b>	<b>Cycle B</b> <b>2023 - 2024</b>	<b>Cycle C</b> <b>2024 - 2025</b>
Class 2 Y1 – Y3	<b>BIOLOGY</b>	<p><b><u>ANIMALS (OTHER ANIMALS)</u></b></p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). Find out and describe how animals look different to one another. Group together animals according to their different features. Recognise similarities between animals: structure: head, body, way of moving, senses, body covering, tail. Animals have senses to explore the world around them</p>	<p><b><u>ANIMALS (INCLUDING HUMANS) – NUTRITION &amp; EXERCISE</u></b></p> <p>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. An adequate and varied diet is beneficial to health (along with a good supply of air and clean water). Regular and varied exercise from a variety of different activities is beneficial to health (focus on energy in versus energy out. Include information on making informed choices).</p> <p><b><u>ANIMALS (INCLUDING HUMANS) – Skeletons and Movement</u></b></p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and</p>	<p><b><u>ANIMALS (INCLUDING HUMANS) – SURVIVAL, GROWTH &amp; STAYING HEALTHY</u></b></p> <p>Notice that humans have offspring which grow into adults. Find out about and describe the basic needs of humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Medicines can be useful when we are ill. Medicines can be harmful if not used properly.</p> <p><b><u>ANIMALS - ANIMAL SURVIVAL AND GROWTH</u></b></p> <p>Notice that animals have offspring which grow into adults. Find out about and describe the basic needs of animals</p>

and to help them to survive.

Recognise that animals need to be treated with care and sensitivity to keep them alive and healthy.

Animals are alive; they **move, feed**, grow, use their **senses** and reproduce.

#### **LIVING THINGS AND THEIR HABITATS**

Explore and compare the differences between things that are living, dead, and things that have never been alive.

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.

Identify and name a variety of plants and animals in their habitats, including micro-habitats.

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.

Different kinds of plants and animals live in different kinds of places.

There are different kinds of habitat near school which need to be cared for

Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples).

Observe living things in their habitats during different seasonal changes

#### **PLANTS - FUNCTIONS OF PARTS OF A PLANT**

Identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.

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

Investigate the way in which water is transported within plants.

Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Know that:

Roots grow downwards and anchor the plant.

Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit.

Nutrients (not food) are taken in through the roots.

Stems provide support and enable the plant to grow towards the light.

Plants make their own food in the leaves using energy from the sun.

movement.

Identify animals (vertebrates) which have a skeleton which supports their body, aids movement and protects vital organs (be able to name some of the vital organs). Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move and protect their vital organs.

Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.

Know that muscles, which are attached to the skeleton, help animals move parts of their body.

Explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth – e.g. do people with longer legs have longer arm spans? Is the size of our head related to our height? etc.

Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.

#### **PLANTS: COMMON NAMES AND BASIC STRUCTURE**

Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.

Identify and describe the basic structure of a variety of common flowering plants, including trees.

for survival (water, food and air).

#### **PLANTS: PLANT GROWTH**

Observe and describe how seeds and bulbs grow into mature plants.

Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (and how changing these affects the plant).

Plants are living and eventually die.

#### **HEALTHY EATING: HOW WE GROW AND STAY HEALTHY**

Describe the importance for humans of eating the right amounts of different types of food.

		<p>Flowers attract insects to aid pollination. Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. Seeds are formed after the flowers are pollinated. Many flowers produce fruits which protect the seed and/or aid seed dispersal. Seed dispersal, by a variety of methods, helps ensure that new plants survive. Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil).</p>		
	<b>CHEMISTRY</b>	<p><b><u>MATERIAL PROPERTIES – EVERYDAY MATERIALS</u></b> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock (and brick, paper and cardboard). Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p><b><u>MATERIAL PROPERTIES - ROCKS</u></b> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter. Rocks and soils can feel and look different. Rocks and soils can be different in different places/environments.</p> <p><b><u>MATERIAL PROPERTIES – USES OF MATERIALS</u></b> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, water, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying a force). Some materials can be found naturally; others have to be made.</p>	
	<b>PHYSICS</b>	<p><b><u>LIGHT - REFLECTIONS AND SHADOWS</u></b> Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the size of shadows can change.</p>		<p><b><u>FORCES – NON CONTACT FORCES</u></b> Compare how some things move on different surfaces. Notice that some forces need contact between two objects but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. 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. Describe magnets as having two poles (like and unlike poles). Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p><b><u>SEASONAL CHANGES</u></b> Observe and describe changes across the four seasons. Observe and describe weather associated with the seasons and how day length and temperature varies.</p>
		<b>Y2 Unit</b>	<b>Y1 Unit</b>	<b>Y3 Unit</b>

	<p><b>Scientists &amp; Inventors (additional units)</b></p>	<p>Children will learn about the invention of the waterproof coat, and will explore other waterproof materials by carrying out simple tests. Children will find out about the work of doctors, and will learn about Elizabeth Garrett Anderson, the first woman doctor in Britain. Children will have the opportunity to create their own greenhouse based on the invention of the biomes at the Eden Project, and use their greenhouse to compare the growth of plants. They will learn about how germs are spread, looking at the work of Louis Pasteur and carrying out a fun experiment to prove how far germs can spread in a few minutes. Children will set up a small world to show the effects of water pollution, as discovered by Rachel Carson during her research on ocean habitats. They will also learn about the development of wind turbines and how this invention is used to generate power.</p>	<p>Children will learn about the invention of Lego and ear muffs, and will explore the materials used to make them. They will investigate other materials that keep us warm, carrying out simple tests. Children will find out about the work of animal scientists, such as vets and zoo keepers. They will group and sort animals to make their own paper zoo, and will act in role as a vet, identifying the body parts of different animals. Children will have the opportunity to collect data when finding out about horticulturists and meteorologists. They will create bar charts of their favourite sensory plants and make rain gauges to gather data on rainfall.</p>	<p>Children will learn about the men and women who risked their lives to find new plants, and will design their own new plant, thinking about its requirements for life. The children will learn about Marie Curie and her work on radiation. They will find out how she developed the medical use of x-rays and create their own x-ray model. Children will consider what plants need to grow well through exploring the life and discoveries of George Washington Carver. They will find out about William Smith and how he learnt that the fossils found inside rocks can be used to tell the age of the rocks as well as the modern-day applications of this. They will use his ideas to design their own island. Furthermore, they will learn about Inge Lehmann, the woman who discovered that the Earth's core is solid. The children will have chance to investigate how images change in convex and concave mirrors and will hear about the inventions and devices that use convex and concave mirrors. Children will complete a timeline of the first electromagnets, create their own electromagnet and test its strength. They will develop their scientific enquiry skills, making observations, predictions and conclusions.</p>
	<p><b>Key Vocabulary</b></p>	<p><b><u>ANIMALS (OTHER ANIMALS)</u></b>  <b>Parts of the body for animals:</b> head, leg, body, beak, wing, senses (eyes, ears, nose, mouth/mouth parts, hands/paws/claws/talons).  <b>Features linked to movement:</b> fly, swim, crawl, run, climb.  <b>Features linked to body covering:</b> feathers, fur, scales, colour, camouflage.  <b>Common animal types:</b> mammal, bird, fish, amphibians, reptiles.</p> <p><b><u>LIVING THINGS AND THEIR HABITATS</u></b>  Animals, plants, habitat / micro-habitat, living / dead / never been alive, species, suited to, survive, basic needs, food chain, seashore, ocean, woodland, rainforest.</p> <p><b><u>PLANTS - FUNCTIONS OF PARTS OF A PLANT</u></b>  Role, part/structure, flowering plant, root / roots, leaf / leaves, stem / stalk / trunk / branch, flowers, blossom, petal, pollen, transfer, pollination, seed formation, seed, bulb, fruit, berry, seed dispersal (explosion, wind, water, animal), transported, insects / birds / animals.  Life cycle, grow / growth, reproduce, air, light (dark / light), water (damp / wet / dry), nutrients, soil, fertiliser, volume (liquids), temperature (hot / warm / cool / cold).  Words to describe physical characteristics of plants e.g. yellow, pale, thin, spindly, healthy,</p> <p><b><u>MATERIAL PROPERTIES – EVERYDAY MATERIALS</u></b></p>	<p><b><u>ANIMALS (INCLUDING HUMANS) – NUTRITION &amp; EXERCISE</u></b>  Food/feed/feeding, growth, activity, healthy, unhealthy, nutrition, exercise, choice, balanced diet, lifestyle, adequate and varied diet, the right types and amount of nutrients.  <b>Food groups:</b> vegetables, meat, fish, sugars and starches, fruit, fat.</p> <p><b><u>ANIMALS (INCLUDING HUMANS) – Skeletons and Movement</u></b>  <b>Words relating to skeletons and muscles:</b> bones, skeleton, muscle(s), ribs, backbone/spine, vertebra, skull, joints, sockets.  <b>Features of skeletons:</b> movement, support, protection (organs).  <b>Animal groups:</b> vertebrates and invertebrates, insects, minibeasts, mammals, reptiles, fish, birds, amphibians.</p> <p><b><u>PLANTS: COMMON NAMES AND BASIC STRUCTURE</u></b>  <b>Labelling features:</b> plant, seedling, tree, leaf, flower, blossom, petals, fruit, root, bulb, seed, stem, branch, twig, trunk.  <b>Common names for plants:</b> daisy, dandelion, oak tree, etc.  <b>Categories of plants:</b> deciduous, evergreen, wild plant, indoor plant, herb, weed, vegetable/fruit/salad crop.</p> <p><b><u>MATERIAL PROPERTIES – ROCKS</u></b></p>	<p><b><u>ANIMALS (INCLUDING HUMANS) – SURVIVAL, GROWTH &amp; STAYING HEALTHY</u></b>  Healthy, diet, off-spring, exercise, proteins, carbohydrates, fats, nutrition, survival, hygiene  <b>Parts of the body for humans:</b> body, head, neck, arms, legs, face, ears, eyes, nose, hair, mouth, hands, wrists, elbows, fingers, nails, feet, toes, knees, thigh, ankles, calf, eyebrows, eyelashes, teeth, tongue, lips, hips, waist, chest, shoulders, back.</p> <p><b><u>PLANTS: PLANT GROWTH</u></b>  <b>Labelling features:</b> root, stem, leaf, flower, seeds, seedlings, plants, branch, twig, trunk, and weed.  <b>Names for plants</b> e.g. daisy, dandelion, oak tree.  <b>Words and phrases relating to living and non-living things and life processes:</b> e.g. living, non-living, alive, not alive, dead, healthy, grow.</p> <p><b><u>FORCES – NON CONTACT FORCES</u></b>  <b>Move, movement:</b> fly, bounce, slide, spin, roll, swirl, swing, forward, backward, upwards, downwards, faster, slower, accelerate, decelerate, ramp, incline.  Push, pull, squeeze, springy, attract, repel, magnetic, non-magnetic, attraction, repulsion, names of common metals (e.g. iron, copper, aluminium), poles, horseshoe magnet, bar magnet, ring magnet, button magnet.  Stronger / weaker, best / worse.</p> <p><b><u>SEASONAL CHANGES</u></b></p>

		<p><b>Common material names:</b> metal, plastic, wood, paper, glass, clay, rock, brick, fabric, sand, papers, cork, shell, water, elastic, foil, etc.</p> <p><b>Words used to describe materials and their properties:</b> hard/soft, rough/smooth, shiny/dull, bendy/not bendy, stretchy/stiff, waterproof/not waterproof, absorbent/not absorbent, magnetic, transparent, opaque, float, wet, squashy, strong.</p> <p><b><u>LIGHT - REFLECTIONS AND SHADOWS</u></b> See, seen, light, light source, eyes, travel, torch, shadow, opaque, transparent, translucent, block, reflect, reflection, reflective, mirror, direction.</p>	<p><b>Words describing rocks:</b> rock, stone, pebble, slate, marble, chalk, granite, sand, sandstone, hard, texture, grains, crystals, contains fossils, sedimentary.</p> <p><b>Words describing soils:</b> darker, lighter, organic matter, leaf litter, grains, clay, sandy, grains. Rub together, break apart/break up, permeable, non-permeable, acid rain, weathering, erosion.</p> <p><b><u>MATERIAL PROPERTIES – USES OF MATERIALS</u></b> <b>Common materials:</b> metal, plastic, wood, paper, glass, rock, clay, brick, fabric, sand, paper, card/cardboard, water, elastic, foil, cork, shell, rubber.</p> <p><b>Words used to describe materials and their properties:</b> hard/soft, rough/smooth, shiny/dull, stretchy/not stretchy, flexible/bendy/not bendy/stiff/rigid, waterproof/not waterproof, absorbent/not absorbent, magnetic, transparent, opaque, translucent, float, wet, squashy, strong/breaks easily, wobbly, sticky, uncomfortable.</p> <p><b>Words associated with changing shape:</b> push/pushing, pull/pulling, stretch/stretching, squash/squashing, squeeze/squeezing, twist/twisting, bend/bending, pinch/pinching, poke/poking, roll/rolling.</p>	<p>Autumn, Spring, Summer, Winter, weather, temperature, thermometer, weather symbol, deciduous, coniferous</p>
		<p><b>Cycle A</b> <b>2022 - 2023</b></p>	<p><b>Cycle B</b> <b>2023 - 2024</b></p>	<p><b>Cycle C</b> <b>2024 - 2025</b></p>
<p><b>Class 3</b> <b>Y4 – Y6</b></p>	<p><b>BIOLOGY</b></p>	<p><b><u>Environment – Evolution and Inheritance</u></b> 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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p><b><u>Animals – Teeth and Digestion</u></b> Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey. Describe how teeth and gums have to be cared for in order to keep them healthy.</p> <p><b><u>Environment - Classification</u></b> 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. Give reasons for classifying plants and animals based on specific characteristics. Living things can be grouped into micro-organisms, plants and animals. Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. Invertebrates can be grouped as snails and slugs, worms, spiders and insects. Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses).</p>	<p><b><u>Animals / Health – Exercise, Health and the Circulatory System</u></b> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans. The heart is a major organ and is made of muscle. The heart pumps blood around the body through vessels and this can be felt as a pulse. The heart pumps blood through the lungs in order to obtain a supply of oxygen. Blood carries oxygen/essential materials to different parts of the body. During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase. Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals). Tobacco, alcohol and other ‘drugs’ can be harmful.</p>

			<p><b><u>Living Things and Their Habitats</u></b>          Recognise that living things can be grouped in a variety of ways.          Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.          Construct and interpret a variety of food chains, identifying producers, predators and prey.          Recognise that environments can change and that this can sometimes pose dangers to living things.          Use and make identification keys for plants and animals.</p>	<p>All medicines are drugs, not all drugs are medicines.  <b><u>Observing Life Cycles</u></b>          Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.          Describe the life process of reproduction in some plants and animals.          Plants produce pollen from the stamen (male part of a plant) which is transferred to the stigma and then the ovary (female parts of the plant).          Fertilisation occurs in the ovary of the flower.          Seeds are formed as a result of fertilisation.  <b><u>Animals – Human Life Cycles</u></b>          Describe the changes as humans develop to old age.          Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.</p>
<p><b>CHEMISTRY</b></p>		<p><b><u>Material Properties – Testing Material Properties</u></b>          Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.          Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (advantages and disadvantages).          Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity).          Know that in temperature and thermal insulation:          Heat always moves from hot to cold.          Some materials (insulators) are better at slowing down the movement of heat than others.          Objects/liquids will warm up or cool down until they reach the temperature of their surroundings.</p>		<p><b><u>Material Changes - Reversible Changes</u></b>          Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.          Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.          Demonstrate that dissolving, mixing and changes of state are reversible changes.          Changes can occur when different materials are mixed.          Some material changes can be reversed and some cannot.          Recognise that dissolving is a reversible change.          Distinguish between melting and dissolving.          Mixtures of solids (of different particle size) can be separated by sieving.          Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (undissolved).          Evaporation helps us separate soluble materials from water.          Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed).          Freezing, melting and boiling changes can be reversed .  <b><u>Material Properties and Changes - States of Matter</u></b>          Compare and group materials together, according to whether they are solids, liquids or gases.          Solids, liquids and gases can be identified by their observable properties.          Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).          Liquids can pour and take the shape of the container in which they are put.          Liquids form a pool not a pile.</p>

				<p>Solids in the form of powders can pour as if they were liquids but make a pile not a pool.  Gases fill the container in which they are put.  Gases escape from an unsealed container.  Gases can be made smaller by squeezing/pressure.  Liquids and gases can flow.</p>
<b>PHYSICS</b>		<p><b><u>Light and Astronomy – Earth &amp; Space</u></b>  Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.  Describe the movement of the Moon relative to the Earth.  Describe the Sun, Earth and Moon as approximately spherical bodies.  Use the idea of the Earth’s rotation to explain day and night.  Children should know that:  The Earth spins once around its own axis in 24 hours, giving day and night.  The Earth orbits the Sun in one year.  We can see the Moon because the Sun's light reflects off it.  The Moon orbits the Earth in approximately 28 days and changes to the appearance of the Moon are evidence of this.  The Sun appears to move across the sky from East to West and this causes shadows to change during the day. Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth.</p> <p><b><u>Forces - Effects on Movement</u></b>  Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.  Identify the effects of air resistance, water resistance and friction that act between moving surfaces.  Friction, air resistance and water resistance are forces which slow down moving objects.  Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.  There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity).  Gravity can act without direct contact between the Earth and an object.  Friction, air resistance and water resistance can be useful or unwanted.  The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect.  More than one force can act on an object</p>	<p><b><u>Sound</u></b>  <b><u>Vibrations</u></b>  Identify how sounds are made, associating some of them with something vibrating.  Recognise that vibrations from sounds travel through a medium to the ear.  Find patterns between the volume of a sound and the strength of the vibrations that produced it.  Recognise that sounds get fainter as the distance from the sound source increases.  Know that sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body).  Know that sounds travel away from their source in all directions.  Know that vibrations may not always be visible to the naked eye.</p> <p><b><u>Pitch</u></b>  Find patterns between the pitch of a sound and features of the object that produced it.  Know that sounds can be high or low pitched.  Know that the pitch of a sound can be altered.  Know that pitch can be altered by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column.</p> <p><b><u>Muffling / Blocking Sounds</u></b>  Recognise that vibrations from sounds travel through a medium to the ear.  Know that sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase).  Know that sounds can travel through solids, liquids and air/gas by making the materials vibrate.  Know that sound travel can be reduced by changing the material that the vibrations travel through.  Know that sound travel can be blocked.</p> <p><b><u>Light and Astronomy – How Light Travels</u></b>  Recognise that light appears to travel in straight lines.  Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.  Explain that we see things because the light that travels from light sources to our eyes or from light sources to objects and then to our eyes.  Use the idea that light travels in straight lines to explain</p>	

		<p>simultaneously (either reinforcing or opposing each other).</p> <p><b>Electricity</b></p> <p>Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors. Know that electricity can be dangerous.</p> <p>Recognise electricity sources can be mains or battery. Know that batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work.</p> <p>Recognise that faults in circuits can be found by methodically testing connections.</p> <p>Know that drawings, photographs and diagrams can be used to represent circuits</p> <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</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.</p> <p>Use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram.</p> <p>Use and interpret circuit diagrams to construct a variety of more complex circuits predicting whether they will 'work'.</p>	<p>why shadows have the same shape as the objects that cast them.</p>	
	<p><b>Scientists &amp; Inventors (additional units)</b></p>		<p><b>Y4 Unit</b></p> <p>Children will learn about the dangers posed to living things in Madagascar, and Gerald Durrell's conservation efforts on the island. They will learn about Alexander Graham Bell and his invention of the telephone, as well as modern improvements on his invention by inventors like James West. Children will look at the early uses of solar energy in homes, invented and built by Maria Telkes and Eleanor Raymond. The many inventions of Garret Morgan will be looked at followed by learning about the discovery of oxygen. Furthermore, the children will learn about Lord Kelvin, the man who determined the temperature of absolute zero. They will also explore the work of Thomas Edison, carrying out an electricity hunt around school. Finally, children will find</p>	<p><b>Y5 Unit</b></p> <p>Children will learn about the life and work of David Attenborough and create a documentary about a living thing of their choice. The children will learn about how CSI technicians use scientific techniques to analyse evidence and prove or disprove theories. They will use chromatography to analyse the ink used in a spelling test and use this evidence to support their own theories. Children will find out about Margaret Hamilton and her invention of the software and computer code that enabled Apollo 11 to go the Moon. They will research into her achievements completing a timeline about her life. They will look at the classification of planets and create fact files on the planets in our solar system through finding out about Neil deGrasse Tyson's role in</p>



			<p>out about the invention of toothpaste, making comparisons between brands.</p> <p>Y5 Unit</p> <p>Children will learn about the life and work of David Attenborough and create a documentary about a living thing of their choice. The children will learn about how CSI technicians use scientific techniques to analyse evidence and prove or disprove theories. They will use chromatography to analyse the ink used in a spelling test and use this evidence to support their own theories. Children will find out about Margaret Hamilton and her invention of the software and computer code that enabled Apollo 11 to go the Moon. They will research into her achievements completing a timeline about her life. They will look at the classification of planets and create fact files on the planets in our solar system through finding out about Neil deGrasse Tyson's role in the reclassification of Pluto. The children will explore the Eva Crane's research into bees and will play a game about the life cycle of bees. Children will investigate the hardness of materials and consider Stephanie Kwolek's invention of Kevlar. Furthermore, they will learn about Leonardo da Vinci's ideas about the proportions of the human body seen in his work The Vitruvian Man. The children will measure their height, arm span and other measurements to see whether da Vinci's theories about proportion were accurate. Finally, the children will find out about the scientific theories surrounding the construction of Stonehenge. They will explore the evidence that suggests that Stonehenge could have been used as an astronomical calendar, and develop their own theories based on this evidence.</p>	<p>the reclassification of Pluto. The children will explore the Eva Crane's research into bees and will play a game about the life cycle of bees. Children will investigating the hardness of materials and consider Stephanie Kwolek's invention of Kevlar. Furthermore, they will learn about Leonardo da Vinci's ideas about the proportions of the human body seen in his work The Vitruvian Man. The children will measure their height, arm span and other measurements to see whether da Vinci's theories about proportion were accurate. Finally, the children will find out about the scientific theories surrounding the construction of Stonehenge. They will explore the evidence that suggests that Stonehenge could have been used as an astronomical calendar, and develop their own theories based on this evidence.</p>
	<p><b>Key Vocabulary</b></p>	<p><b><u>Environment – Evolution and Inheritance</u></b>          Evolution, change over time, species, population, features, trait, inherited, reproduce, offspring, variation, mutation, survive/survival/survival of the fittest, adaptation, consumer, producer, predator, prey, food chain, consumer, producer, key, suited.</p> <p><b><u>Living Things and Their Habitats</u></b>  <b>Words related to:</b> life processes - nutrition, habitats, feeding.  <b>Relationships:</b> environment, habitat, condition, organism, carnivore, herbivore, omnivore, predator, prey, producer, consumer, food chain, key, classify, classification key, positive human impact, negative human impact.  <b>Words which have a different meaning in other contexts:</b> producer, consumer, key, condition.          Vertebrates and invertebrates: insects, minibeasts, mammals, reptiles, fish, birds, amphibians.</p> <p><b><u>Material Properties – Testing Material Properties</u></b></p>	<p><b><u>Animals – Teeth and Digestion</u></b>          Eat, chew, breakdown, saliva, swallow, feed, feeding, healthy, unhealthy, function, producer, predator, prey, dentist, toothpaste, dental care, hygienist, teeth, gums, incisor, molar, canine.          Digestive system, mouth, tongue, oesophagus, stomach, small intestine, large intestine, faeces.  <b>Words which have different meanings in other contexts,</b> e.g. diet, root, activity, decay, evidence, conclusion.  <b>Other words which might arise through discussion / research</b> e.g. peristalsis, digestive juices, churn, energy, nutrients, absorbed, blood, liver, bladder, anus.</p> <p><b><u>Environment - Classification</u></b>          Sort, group, identify, classify, environment, suited, classification system, key, habitat, characteristics, features, compare and contrast</p> <p><b><u>Sound</u></b>          Sound, source, quiet, soft, noise, vibrate, vibration,</p>	<p><b><u>Animals / Health – Exercise, Health and the Circulatory System</u></b>          Heart, heartbeat, pulse, pulse rate, muscle, blood vessel, blood, lung, oxygen, oxygenated blood, deoxygenated blood, carbon dioxide, circulate, circulatory system, organ.          Diet, exercise, drugs, lifestyle, body function, harmful, healthy, damaged, nutrients, water, transported, substances.</p> <p><b><u>Observing Life Cycles</u></b>          Mammals, amphibians, reptiles and plants.          Live young/eggs, gestation/incubation period, grow, metamorphosis, parental care/no parental care.          Flowering and non-flowering plants, classifying, classification.          Reproduction/reproduce, fertilisation/fertilise, germination/germinate, pollination/pollinate.          Stamen, style, stigma, sepal, petal, ovary, pollen.          Adapted, adaptations, suited to its environment /</p>

**Words describing the characteristics of materials** e.g. strong, hard, flexible, absorbent, transparent, etc. PLUS thermal conductor, thermal insulator, thermal conductivity.

**Words and phrases related to warmth and cold** e.g. temperature, thermometer, degrees Celsius.

**Words related to the investigation of these properties** e.g. investigate, test, describe, explain, comparison, fair, conclude, evidence, comparison / compare, description / describe.

**Words which have different meanings in other contexts** e.g. test, fair, conclude.

#### **Light and Astronomy – Earth & Space**

Sphere/spherical, revolve, orbit, spin, rotate, axis, sunrise, sunset, north, south, east, west, rotate around, rotate on its axis.

Solar System, Sun, Moon, star, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, planet, conditions, features.

Sundial, shadow clock, time, time zones.

Model, compare, evidence.

#### **Forces - Effects on Movement**

Friction, air resistance, water resistance, force-meter, Newtons, surface area, gravity, movement, between surfaces

**Lots of friction:** gripping, stuck, don't slide or move easily, lots of surfaces touching, not slipping, like they are glued together.

**Not much friction:** slippery, sliding over each other, hard to grip onto, liquids stopping the surfaces touching each other easily).

#### **Light and Astronomy – How Light Travels**

See, seen, light source, eyes, travel, shadow, opaque, block, reflect, reflection, mirror, direction, light travelling, light beam, straight lines, cast, periscope, rear-view mirror, object, shadow puppet, rainbow, colours, bend, split.

#### **Electricity**

Cell (battery), wire, bulb, bulb holder, buzzer, motor, switch (open/closed), complete circuit, electrical conductor, electrical insulator, component, circuit symbol, circuit diagram, standard symbols, voltage.

Connection, component, break, fault, mains, wire.

Devices, appliances, mains electricity, safety.

Common materials e.g. metal, wood, plastic.

Comparative expressions e.g. brighter, less bright (bulbs); faster, slower (motors).

travel, loudness, volume, loud/quiet, faint / fainter, pitch, high/low, muffle, tuning, tension, tight, air, air column, instrument (strings, brass, woodwind, percussion).

habitat.

Similarities and differences, compare and contrast, research.

#### **Animals – Human Life Cycles**

Part of PSHE curriculum – linked vocabulary

#### **Material Changes - Reversible Changes**

Dissolved, undissolved, solution, mixture, filter, sieve, evaporate, condense, melting, separate, reversible, irreversible, reaction, product, material, powder, substance, acid, change, burning, rusting.

Words and phrases related to data handling e.g. bar line graph, line graph, average, accurate.

#### **Material Properties and Changes - States of Matter**

Solid, liquid, gas, property, change, temperature, change state, heated, cooled, temperature, degrees Celsius, water cycle.

Condensation/condense, evaporation/evaporate, melting/melt, freezing/freeze, solidification/solidity, boiling temperature.

Particle, air, carbon dioxide, oxygen, helium, natural gas, viscosity.

States of matter.

Measure, compare, group, research, observe.