



Science

Progression Map of Scientific Knowledge and Conceptual Understanding

	Living Things and their Habitats - Classification	Living Things and their Habitats – Evolution and Inheritance	Animals/Health – Exercise, Health and The Circulatory System	Light and Astronomy – How Light Travels	Electricity
Year 6	<ul style="list-style-type: none"> - 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). 	<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - 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 (in the long term and short term). - 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. - All medicines are drugs, not all drugs are medicines. 	<ul style="list-style-type: none"> - 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 (and represent this in simple diagrammatic form). - Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 	<ul style="list-style-type: none"> - Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. - 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. - Use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram. - Use/interpret circuit diagrams to construct a variety of more complex circuits predicting whether they will 'work'.
Year 5	Environment - Observing Life cycles	Material Properties – Testing Material Properties	Material Changes - Reversible changes	Animals - Human Life Cycles	Light and Astronomy – Earth and Space
	<ul style="list-style-type: none"> - 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. o Name, locate and describe the functions of the main parts of reproductive system of plants (stigma, stamen, petal, sepal, pollen, ovary). 	<ul style="list-style-type: none"> - 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). o Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity). Temperature and Thermal Insulation <ul style="list-style-type: none"> o Heat always moves from hot to cold. o Some materials (insulators) are better at slowing down the movement of heat than others. o Objects/liquids will warm up or cool down until they reach the temperature of their surroundings. 	<ul style="list-style-type: none"> - 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. o Changes can occur when different materials are mixed. o Some material changes can be reversed and some cannot. o Recognise that dissolving is a reversible change and recognise everyday situations where dissolving occurs. o Distinguish between melting and dissolving. o Mixtures of solids (of different particle size) can be separated by sieving. o Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved). o Evaporation helps us separate soluble materials from water. o Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed, etc). o Freezing, melting and boiling changes can be reversed (revision from YR4). Irreversible Changes - Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, and the action of acid on bicarbonate of soda (producing a gas / fizzing). 	<ul style="list-style-type: none"> - Describe the changes as humans develop to old age. o Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. 	<ul style="list-style-type: none"> - Describe the movement of the Earth, and other planets, relative to the Sun and each other in the solar system. - Describe the movement of the Moon relative to the Earth. - Describe Sun/Earth/Moon as approximately spherical bodies. - Use the idea of the Earth's rotation to explain day and night. o The Earth spins once around its own axis in 24 hours, giving day and night. o The Earth orbits the Sun in one year. o We can see the Moon because the Sun's light reflects off it. o The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. o Use the Earth's movement in space to explain the apparent movement of the sun across the sky. o The Sun appears to move across the sky from East to West and this causes shadows to change during the day. o 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.
	Environment – Living Things and Their Habitats	Animals – Teeth, Eating and Digestion	Material Properties and Changes – States of Matter	Sound	Electricity
					<ul style="list-style-type: none"> - 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 (causing things to slow down) - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. o There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity) which have different effects on objects o Gravity can act without direct contact between the Earth and an object. o Friction, air resistance and water resistance can be useful or unwanted. o The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. o More than one force can act on an object simultaneously (either reinforcing or opposing each other).

<p>Year 4</p>	<p>- Recognise that living things can be grouped in a variety of ways.</p> <p>- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>- Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <ul style="list-style-type: none"> o Use and make identification keys for plants and animals. 	<p>- Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>- Identify the different types of teeth in humans and their simple functions.</p> <p>- Construct and interpret a variety of food chains, identifying producers, predators and prey (NB Link with types of teeth and eating in this unit but this concept could be developed further in the yr4 Environment / habitats unit).</p> <ul style="list-style-type: none"> o Describe how teeth and gums have to be cared for in order to keep them healthy. 	<p>- Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</p> <p>- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <ul style="list-style-type: none"> o Solids, liquids and gases can be identified by their observable properties. o Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action). o Liquids can pour and take the shape of the container in which they are put. o Liquids form a pool not a pile. o Solids in the form of powders can pour as if they were liquids but make a pile not a pool. o Gases fill the container in which they are put. o Gases escape from an unsealed container. o Gases can be made smaller by squeezing/pressure. o Liquids and gases can flow. 	<p>Vibrations</p> <ul style="list-style-type: none"> - 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. o Recognise that sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body). o Sounds travel away from their source in all directions. o Vibrations may not always be visible to the naked eye <p>Pitch</p> <ul style="list-style-type: none"> - Find patterns between the pitch of a sound and features of the object that produced it. o Sounds can be high or low pitched. o The pitch of a sound can be altered. o Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column. <p>Muffling/blocking sounds</p> <ul style="list-style-type: none"> - Recognise that vibrations from sounds travel through a medium to the ear. o Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase). o Sounds can travel through solids, liquids and air/gas by making the materials vibrate. o Sound travel can be reduced by changing the material that the vibrations travel through. o Sound travel can be blocked. 	<ul style="list-style-type: none"> - 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. - 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. - Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. - Recognise some common conductors and insulators, and associate metals with being good conductors. o Electricity can be dangerous. o Electricity sources can be mains or battery. o Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work. o Faults in circuits can be found by methodically testing connections. o Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2). 	
	<p>Plants – Functions of Parts of a Plant</p>	<p>Animals - Health/Nutrition</p>	<p>Animals - Skeletons and Movement</p>	<p>Material Properties - Rocks</p>	<p>Light and Astronomy - Light, reflections and shadows</p>	<p>Forces and Magnets</p>

Year 3	<p>- Identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>- 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.</p> <p>- Investigate the way in which water is transported within plants.</p> <p>- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <ul style="list-style-type: none"> o Roots grow downwards and anchor the plant. o Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit. o Nutrients (not food) are taken in through the roots. o Stems provide support and enable the plant to grow towards the light. o Plants make their own food in the leaves using energy from the sun. o Flowers attract insects to aid pollination. o Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. o Seeds are formed after the flowers are pollinated. o Many flowers produce fruits which protect the seed and/or aid seed dispersal. o Seed dispersal, by a variety of methods, helps ensure that new plants survive. o Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil). 	<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.</p> <p>- An adequate and varied diet is beneficial to health (along with a good supply of air and clean water).</p> <p>- 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>- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>- Identify animals (vertebrates) which have a skeleton which supports their body, aids movement & protects vital organs (e.g. name and locate skull, backbone, ribs, bones for movement/limbs, pelvis and be able to name some of the vital organs protected).</p> <p>- Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move & protect their vital organs.</p> <ul style="list-style-type: none"> o 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. o Know that muscles, which are attached to the skeleton, help animals move parts of their body. o 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? o Recognise that animals are alive; they move, feed, grow, use their senses and reproduce. 	<p>- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>- Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>- Recognise that soils are made from rocks and organic matter</p> <ul style="list-style-type: none"> o Recognise that rocks and soils can feel and look different. o Recognise that rocks and soils can be different in different places/environments. 	<p>- Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>- Notice that light is reflected from surfaces.</p> <p>- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>- Recognise that shadows are formed when the light from a light source is blocked by a solid object.</p> <p>- Find patterns in the way that the size of shadows can change.</p>	<p>- Compare how some things move on different surfaces.</p> <p>- Notice that some forces need contact between two objects but magnetic forces can act at a distance.</p> <p>- Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>- 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.</p> <p>- Describe magnets as having two poles (like and unlike poles).</p> <p>- Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>
Year 2	<p>Environment - Living things and their habitats</p> <p>- Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p> <p>- Identify and name a variety of plants and animals in their habitats, including micro-habitats.</p> <p>- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> <ul style="list-style-type: none"> o Different kinds of plants and animals live in different kinds of places. o There are different kinds of habitat near school which need to be cared for o Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). o Observe living things in their habitats during different seasonal changes. 	<p>Animals - Animal survival and growth</p> <p>- Notice that animals have offspring which grow into adults.</p> <p>- Find out about and describe the basic needs of animals for survival (water, food and air).</p>	<p>Health – How we grow and stay healthy</p> <p>- Notice that humans have offspring which grow into adults.</p> <p>- Find out about and describe the basic needs of humans, for survival (water, food and air).</p> <p>- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <ul style="list-style-type: none"> o Medicines can be useful when we are ill. o Medicines can be harmful if not used properly. 	<p>Plants – Plant growth</p> <p>- Observe and describe how seeds and bulbs grow into mature plants.</p> <p>- 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).</p> <ul style="list-style-type: none"> o Plants are living and eventually die. 	<p>Material Properties – Uses of Materials</p> <p>- 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.</p> <p>- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying a force).</p> <ul style="list-style-type: none"> o Some materials can be found naturally; others have to be made. 	
	<p>Plants: Common Names and Basic Structure</p>	<p>Animals - Humans</p>	<p>Animals - Other Animals</p>	<p>Material Properties – Everyday Materials</p>	<p>Light and Astronomy – Seasonal Change</p>	

<p>Year 1</p>	<p>- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>- Identify and describe the basic structure of a variety of common flowering plants, including trees (at least: flower, leaf, root, stem, trunk, seed, branch and petal).</p>	<p>- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <ul style="list-style-type: none"> o Recognise that humans are animals. o Compare and describe differences in their own features (eye, hair, skin colour, etc.). o Recognise that humans have many similarities. 	<p>- Identify and name a variety of common animals including some fish, some amphibians, some reptiles, some birds and some mammals.</p> <p>- Identify and name a variety of common animals that are carnivores, herbivores and omnivores (i.e. according to what they eat).</p> <p>- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets).</p> <ul style="list-style-type: none"> o Find out and describe how animals look different to one another. o Group together animals according to their different features. o Recognise similarities between animals: structure: head, body, way of moving, senses, body covering, tail. o Animals have senses to explore the world around them and to help them to survive. o Recognise that animals need to be treated with care and sensitivity to keep them alive and healthy. o Animals are alive; they move, feed, grow, use their senses and reproduce. 	<p>- Distinguish between an object and the material from which it is made.</p> <p>- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock, brick, paper and cardboard.</p> <p>- Describe the simple physical properties of a variety of everyday materials.</p> <p>- Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p>- Observe and describe changes across the four seasons.</p> <p>- Observe and describe weather associated with the seasons and how day length and temperature varies.</p>	
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