

Progression of substantive knowledge

Biology	EYFS (Reception in bold)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Future learning
Animals including humans	<p>Know and talk about the different factors that support their overall health and wellbeing: regular physical activity</p> <p>Healthy eating</p> <p>Toothbrushing</p> <p>Sensible amounts of screen time</p> <p>Having a good sleep routine</p> <p>Being a safe pedestrian</p> <p>Use all their senses in hands on exploration of natural materials</p> <p>Continue developing positive attitudes about the differences between people</p>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</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>	<p>Know that animals, including humans, have offspring which grow into adult</p> <p>Know the basic stages in a life cycle for animals, including humans</p> <p>Find out and describe the basic needs of animals, including human for survival (water, food and air).</p> <p>Describe the importance for humans of exercise, eating the right amount of different types of food and hygiene</p>	<p>Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.</p> <p>Know how nutrients, water and oxygen are transported within animals and humans.</p> <p>Know about the importance of a nutritious, balanced diet.</p> <p>Identify that humans and some other animals have skeletons and muscles for support protection and movement</p>	<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</p>	<p>Describe the changes as humans develop to old age.</p> <p>They should learn about the changes experienced in puberty.</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognize the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>	<p>The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. (KS3)</p> <p>The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. (KS3)</p> <p>The structure and functions of the gas exchange system in humans, including adaptations to function. (KS3)</p> <p>The mechanism of breathing to move air in and out of the lungs. (KS3)</p> <p>The impact of exercise, asthma and smoking on the human gas exchange system. (KS3)</p>
Plants	<p>Plant seeds and care for growing plants</p> <p>cress</p> <p>Understand the key features of the life cycle of a plant</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.</p> <p>daffodil</p> <p>Identify and name the roots, trunk, branches and leaves of trees</p>	<p>Find out and describe how plant need water, light and warmth to grow and stay healthy</p> <p>cress</p> <p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>Daffodil</p>	<p>Explore the part flowers play in a flowering plants life cycle, including: pollination, seed formation and seed dispersal</p> <p>Daffodil</p> <p>Identify and describe the functions of different parts of the flowering plant; roots, stem/trunk leaves and flowers</p> <p>Daffodil</p> <p>Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants</p> <p>cress</p>				<p>Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)</p>

				Know the way in which water is transported between plants				
Living things and their habitat	<p>Understand the key features of the life cycle of an animal</p> <p>Begin to understand the need to respect and care for the natural environment and all living things</p> <p>Recognise some environments that are different to the one in which they live</p> <p>Explore the natural world around them</p> <p>Describe what they see, hear and feel when outside</p>		<p>Explore and compare the difference 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 the different sources of food.</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 danger to living things.</p>	<p>Know the life cycle of different living things, e.g. Mammal, amphibian, insect, Bird.</p> <p>Know the differences between different life cycles.</p> <p>Know the process of reproduction in plants. Daffodil</p> <p>Know the process of reproduction in animals</p>	<p>Classify living things into broad groups according to observable characteristics and based on similarities and differences.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>	<p>Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3)</p> <p>Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)</p> <p>Differences between species. (KS3)</p>

<p>Evolution and Inheritance</p>							<p>Know about evolution and can explain what it is.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p>	<p>Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3)</p> <p>A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3)</p> <p>The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3)</p> <p>Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)</p>
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Chemistry	EYFS (Reception in bold)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Future learning
Materials	<p>Compare length, weight and capacity</p> <p>Explore collections of materials with similar and / or different properties</p> <p>Use all their senses in hands on exploration of natural materials</p>	<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, metal, plastic, glass, water and rock,</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 properties</p>	<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>		<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.</p> <p>chocolate</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>chocolate</p> <p>Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p>		<p>Chemical reactions as the rearrangement of atoms. (KS3)</p> <p>Representing chemical reactions using formulae and using equations. (KS3)</p> <p>Combustion, thermal decomposition, oxidation and displacement reactions. (KS3)</p> <p>Defining acids and alkalis in terms of neutralisation reactions. (KS3)</p> <p>The pH scale for measuring acidity/alkalinity; and indicators.</p>
	<p>Talk about the differences between materials and changes they notice</p> <p>Explore different materials freely in order to develop their ideas about how to use them</p>							

	and what to make Join different materials to use to express them					<p>States of matter 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.</p> <p>Comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.</p> <p>Demonstrate that dissolving, mixing changes of state are reversible changes.</p> <p>Explain that some changes result in the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>	
Rocks			<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>			<p>Know how fossils can be used to find out about the past. The composition of the Earth. (KS3) The structure of the Earth. (KS3) The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)</p>	

Physics	EYFS (Reception in bold)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Future learning
Seasonal Changes	Understand the effect of changing seasons on the natural world around them	<p>Observe changes across the four seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies</p>						
Light				<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 sizes of shadows change.</p>			<p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p> <p>Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.</p>	<p>The similarities and differences between light waves and waves in matter. (KS3)</p> <p>Light waves travelling through a vacuum; speed of light. (KS3)</p> <p>The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3)</p> <p>Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. (KS3)</p> <p>Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3)</p> <p>Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)</p>

Forces	<p>Explore how things work (mechanical equipment eg cogs)</p> <p>Explore and talk about different forces they feel</p>			<p>Compare how things move on different surfaces.</p> <p>Know how a simple pulley works and use making lifting an object simpler</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 and 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.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.</p> <p>Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>		<p>Magnetic fields by plotting with compass, representation by field lines. (KS3)</p> <p>Earth's magnetism, compass and navigation. (KS3)</p> <p>Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). (KS3)</p> <p>Forces as pushes or pulls, arising from the interaction between two objects. (KS3)</p> <p>Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3)</p> <p>Moment as the turning effect of a force. (KS3)</p> <p>Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3)</p> <p>Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)</p>
Electricity					<p>Identify common appliances that run on Electricity.</p> <p>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 the circuit and associate this with whether or not a lamp lights in a simple</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 when representing a simple circuit in a diagram</p>	<p>Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3)</p> <p>Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3)</p> <p>Differences in resistance between conducting and insulating components (quantitative). (KS3)</p> <p>Static electricity. (KS3)</p>

					<p>series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors. Know the difference between a conductor and an insulator; giving examples of each.</p> <p>Safety when using electricity.</p>		
Sound					<p>Know how sound is made associating some of them with vibrating.</p> <p>Know what happens to a sound as it travels from its source to our ears.</p> <p>Know the correlation between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Know how sound travels from a source to our ears.</p> <p>Know the correlation between pitch and the object producing a sound.</p>		<p>Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3) Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3) Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3) Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. (KS3) Auditory range of humans and animals. (KS3) Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3) Waves transferring information for conversion to electrical signals by microphone. (KS3)</p>
Earth and Space					<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth</p>		<p>The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3)</p> <p>Our Sun as a star, other stars in our galaxy, other galaxies. (KS3)</p> <p>The light year as a unit of astronomical distance. (KS3)</p>

					and Moon as approximately spherical bodies		
					Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky		