



Science: Substantive Knowledge

Scientific Knowledge and Understanding	Foundation 1 Foundation 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants Foundation Stage, Y1, Y2, Y3	<p>Know how to plants seeds and care for growing plants.</p> <p>Talk about what they see, using a wide vocabulary</p> <p>Know and understand about the need to respect and care for the natural environment and all living things.</p> <p>Know the key features of the life cycle of a plant and an animal.</p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>To begin to understand how plants grow and change over time.</p>	<p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>To know that plants need water and light and a suitable temperature to grow.</p>	<p>Know that deciduous trees lose their leaves seasonally, but evergreen trees do not</p> <p>Identify and describe the functions of different parts of the flowering plant (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem</p> <p>To know the life-cycle of a plant from seed to mature plant</p>			

				To know the needs of different plants for life and growth and that these vary from plant to plant			
Animals including humans F2-Y6	<p>Know what the 5 senses are.</p> <p>Know about the natural world around them.</p> <p>Know how to make observations and drawing pictures of animals and plants.</p> <p>Know that birds lay eggs in a nest.</p> <p>Know some characteristics of birds</p>	<p>To identify and name a variety of common animals (including fish, amphibians, reptiles, birds and mammals).</p> <p>To identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell)</p>	<p>Know the basic stages in a life cycle for animals, (including humans)</p> <p>Know that animals, including humans, have offspring, which grow into adults</p> <p>Know the basic needs of animals, including humans for survival (water, food and air).</p> <p>Understand the importance of exercise, a balanced diet</p>	<p>To know that animals, including humans, need the right types and amount of nutrition.</p> <p>To understand that humans cannot make their own food and therefore eat to get the nutrition needed.</p> <p>To know that the skeleton in humans and some animals is used for movement, protection and support.</p> <p>To know that the muscular</p>	<p>Know the functions of the organs in the human digestive system and know the names of the parts of the human digestive system.</p> <p>To know the different types of human teeth and the functions of different human teeth.</p> <p>To know that predators hunt for their food and prey are the animals being hunted.</p> <p>To know that producers make their own food.</p> <p>To construct and interpret a variety of food chains.</p> <p>To know that food chains begin with a</p>	<p>To describe the changes as humans, develop to old age, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly).</p> <p>To describe changes that occur during puberty (in boys and girls).</p> <p>To know that gestation periods vary across mammals.</p>	<p>To know the main parts of the human circulatory system (heart, blood vessels and blood).</p> <p>To know that the heart pumps blood around the body and that the blood vessels transport blood around the body.</p> <p>To recognise the impact of diet, exercise, drugs and lifestyle on the way a body function.</p> <p>To describe the way in which nutrients and water are transported within animals,</p>

		To identify and name basic parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth), and say which part is associated with which sense.	and hygiene for humans	system in humans and some animals works with the skeleton for movement.	producer followed by consumers, and arrows to show the energy passed on		including humans.
Living things and their habitats F2, Y2, Y4, Y5, Y6	<p>Know that we are humans</p> <p>Know that we are people</p> <p>Know that people can see, hear, smell and touch and taste things</p> <p>Environment: Know and describe what I see, hear and feel whilst outside.</p> <p>Know about the natural world around me.</p>		<p>Explore and compare differences between things that are living, dead and things that have never been alive</p> <p>Know that most living things live in habitats to which they are suited.</p> <p>To understand how living things, change</p>		<p>Know that living things can be grouped in a variety of ways</p> <p>Know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Know that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Know the differences in the life cycle of different living things e.g. mammal, amphibian, insect and bird.</p> <p>Know the life process of reproduction in plants and animals</p>	<p>Know 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</p>

			<p>and that animals have offspring that grow into adults</p> <p>Identify and name a variety of plants and animals in their habitats, including micro habitats.</p> <p>Know 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>				based on specific characteristics.
Materials Foundation, Y1, Y2, Y3, Y4, Y5	<p>Know about and explore collections of materials with similar and/or different properties.</p> <p>Know how to use all their senses in hands-on exploration of natural materials.</p> <p>Know how to manipulate and play with different materials.</p>	<p>Distinguish between an object and the material from which it is made.</p> <p>Know the names of a variety of everyday materials</p>	<p>Identify and compare the suitability of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p>	<p>To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p>	<p>To compare and group materials together according to their state of matter (solid, liquid, gas).</p> <p>To observe that some materials change state when they are heated or cooled and measure or research at which this</p>	<p>To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electric and</p>	

	<p>Play in the mud kitchen.</p> <p>Know about the properties of mud and water.</p> <p>Explore natural objects including rocks and shells</p> <p>Know how to sort rocks and shells</p>	<p>including, wood, plastic, glass, metal and begin to describe them.</p> <p>Describe some physical properties of everyday materials and begin to compare and group them</p>	<p>To know that a push or pull must be applied to change the shape of a solid object.</p> <p>To know that solid objects can be squashed, bent, twisted or stretched.</p> <p>To know that different solid objects may take a different amount of force to change shape</p>	<p>To describe in simple terms how fossils are formed when things that have lived are trapped within the rock</p> <p>To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.)</p> <p>To know that rocks may contain grains, crystals or fossils. To know that grains and crystals appear differently and can be used to classify rocks.</p> <p>To recognise that soils are made from rocks and organic matter</p>	<p>happens in degree Celsius (°C).</p> <p>Know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).</p> <p>Know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>thermal) and response to magnets.</p> <p>To know that some substances will dissolve in a liquid to form a solution.</p> <p>To know the factors that affect the time taken to dissolve, including temperature and stirring.</p> <p>To understand that dissolving, mixing and changes of state are reversible changes.</p> <p>To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes.</p> <p>To understand that some changes result in the formation of new materials</p>	
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<p>Seasonal Changes Foundation, Y1</p>	<p>Seasonal changes: Know about the effect of changing seasons on the natural world around them.</p>	<p>Observe changes across the 4 seasons;</p> <p>Observe and describe weather associated with the seasons and how day length varies</p>					
<p>Forces and magnets Foundation Y3, Y5</p>	<p>Know about and play with magnetic toys. Know how to explore using magnets.</p>			<p>Know about and describe how objects move on different surfaces.</p> <p>Know that some forces need contact between two</p>		<p>To know types of forces: air resistance, water resistance, buoyancy, up thrust, gravitational pull, gravity, opposing forces, driving force.</p>	

				<p>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 everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Know the North and South poles of a magnet</p> <p>To understand that the opposite poles of a magnet attract one another and like poles repel one another.</p>		<p>Know what gravity is and its impact on our lives.</p> <p>Know how some mechanisms (levers, pulleys and gears) allow a smaller force to have a greater effect</p> <p>To know measurements: weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow</p>	
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				To know some uses of magnets.			
Electricity Foundation Y4, Y6	<p>Explore a range of toys with switches</p> <p>Know that some tools and equipment can be turned on and off with a switch.</p>				<p>To identify common appliances that run on electricity</p> <p>To know that all electrical appliances need a power source, including batteries or mains electricity.</p> <p>To know the main components in a simple series circuit. To construct a simple circuit.</p> <p>To understand that an open switch breaks a series circuit so the components will be off.</p> <p>To understand that a closed switch completes a series circuit so the components will be on.</p> <p>To understand the relationship between bulb brightness and the number of bulbs in a circuit.</p>		<p>To know that the voltage of a circuit can be changed and how this affects bulb brightness</p> <p>To know a wider variety of components in a series circuit (including buzzer and motor).</p> <p>To draw circuit diagrams, including the recognised symbols for common components and using straight lines.</p>

					<p>To know that some materials allow electrical charge to pass through them quickly and these are known as electrical conductors (e.g. metals).</p> <p>To know that some materials do not allow electrical charge to pass through them easily and these are known as electrical insulators (e.g. wood and plastic).</p> <p>To know the precautions for working safely with electricity.</p>		
<p>Light Foundation Y3, Y6</p>	<p>Play with torches and lights.</p> <p>Play in dark dens.</p> <p>Talk about dark and light.</p> <p>Notice sun and shadows</p> <p>Know the sun makes it light in the daytime.</p> <p>Know the sun makes shadows.</p>			<p>Know that they need light in order to see things.</p> <p>Know that dark is the absence of light.</p> <p>Know that light is reflected from surfaces.</p>			<p>Know that light appears to travel in straight lines.</p> <p>To know that mirrors and periscopes work using reflection of light on smooth surfaces.</p> <p>To know that shiny surfaces</p>

	<p>Know about sun safety.</p>			<p>Know that a shadow is formed when the light is blocked by an opaque object</p> <p>Know about the dangers of direct sunlight and describe how to protect their eyes.</p> <p>Find patterns in the way that the size of the shadow's changes.</p>			<p>reflect light uniformly.</p> <p>To know that when light is reflected off a surface, its direction changes.</p> <p>To understand why shadows, have the same shape as the objects that cast them as a result of light travelling in straight lines.</p> <p>To understand relationships between light sources, objects and shadows.</p>
<p>Sound Foundation, Y4</p>	<p>Know about different ways to explore their voices and enjoy making sounds.</p> <p>Know about and explore a variety of sound makers and instruments and play them in different ways</p> <p>Know about and explore a range of different sounds</p>				<p>Know how sound is made, associating some sounds with vibrating</p> <p>Know how vibrations sound travels from a source to our ears</p> <p>Know the correlation between pitch and the</p>		

	<p>made by range of instruments. Know that different materials produce different sounds.</p>				<p>object producing a sound</p> <p>Know the correlation between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Know what happens to a sound as it travels away from its source (sound gets fainter).</p>		
<p>Earth and Space Foundation, Y5</p>	<p>Know about day and night Know and talk about the sun, earth and the moon.</p>					<p>Know about the movement of the Earth and other planets, relative to the sun in the solar system</p> <p>Know and describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Know how the idea of the Earth's rotation can be used to</p>	

						explain day and night and the apparent movement of the sun across the sky.	
Evolution and inheritance Y6							<p>Know 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>Know 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</p>

