

SCIENCE KNOWLEDGE PROGRESSION



Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	explore the natural world around them	<p>ask simple questions and recognise that they can be answered in different ways</p> <p>observe closely, using simple equipment</p> <p>perform simple tests</p> <p>identify and classify findings</p> <p>use their observations and ideas to suggest answers to questions</p>	<p>ask simple questions and recognise that they can be answered in different ways</p> <p>observe closely, using simple equipment</p> <p>perform simple tests</p> <p>identify and classify findings</p> <p>use their observations and ideas to suggest answers to questions</p>	<p>ask relevant questions and using different types of scientific enquiries to answer them</p> <p>set up simple practical enquiries, comparative and fair tests</p> <p>make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <p>gather, record, classify and present data in a variety of ways to help in answering questions</p> <p>record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>report on findings from enquiries, including oral and written explanations, displays or presentation of results and conclusions.</p> <p>Use results to draw simple conclusions make predictions for</p>	<p>ask relevant questions and using different types of scientific enquiries to answer them</p> <p>set up simple practical enquiries, comparative and fair tests</p> <p>make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <p>gather, record, classify and present data in a variety of ways to help in answering questions</p> <p>record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>report on findings from enquiries, including oral and written explanations, displays or presentation of results and conclusions.</p> <p>Use results to draw simple conclusions make predictions for new values suggest improvements raise further questions.</p> <p>Identify differences similarities or changes related to simple scientific ideas and processes.</p>	<p>plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>use test results to make predictions to set up further comparative and fair tests</p> <p>report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>	<p>plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>use test results to make predictions to set up further comparative and fair tests</p> <p>report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>

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				<p>new values suggest improvements raise further questions.</p> <p>Identify differences similarities or changes related to simple scientific ideas and processes.</p>			
Asking and answering questions	<p>Answer 'how' and 'why' questions Begin to use 'why' questions</p>	<p>Use everyday language/begin to use simple scientific words to ask or answer a scientific question.</p>	<p>Suggest ideas, ask simple questions and know that they can be answered/investigated in different ways including simple secondary sources, such as books and video clips.</p>	<p>Use ideas to pose questions, independently, about the world around them.</p>	<p>Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT. Answer questions using straight forward scientific evidence.</p>	<p>Raise different types of scientific questions, and hypotheses.</p>	<p>Pose/select the most appropriate line of enquiry to investigate scientific questions</p>
Making predictions	<p>Use past, present and future forms accurately when talking about events that are to happen in the future. Answer 'how' and 'why' questions</p>	<p>Begin to say what might happen in an investigation.</p>	<p>Begin to make predictions</p>	<p>Make predictions and begin to give a reason.</p>	<p>Make predictions and give a reason using simple scientific vocabulary.</p>	<p>Make predictions and give a reason using scientific vocabulary.</p>	<p>Make predictions and give a reason using scientific vocabulary. Base predictions on findings from previous investigations.</p>
Making observations	<p>Estimate, measure, weigh and compare and order objects and talk about properties, position and time. (M – SSM – ELG). ● Make observations of animals</p>	<p>Observe objects, materials and living things and describe what they see.</p>	<p>Observe something closely and describe changes over time</p>	<p>Make decisions about what to observe during an investigation.</p>	<p>Make systematic and careful observations</p>	<p>Plan and carry out comparative and fair tests, making systematic and careful observations.</p>	<p>Make their own decisions about which observations to make, using test results and observations to make predictions or set up further comparative or fair tests.</p>

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	and plants (UTW ELG). ☑ Look at books and the internet to find things out (L-Reading).						
Equipment and measurements	Handle tools and equipment effectively. Use magnifying glasses and mirrors in a practical activity.	Use simple, nonstandard equipment and measurements in a practical task.	Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests	Take accurate measurements using standard units.	Take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.	Take measurements using a range of scientific equipment with increasing accuracy and precision	Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately. Decide how long to take measurements for, checking Science Working Scientifically Skills Progression results with additional readings.
Identifying and classifying	Sort a group of objects according to a given criteria	Sort and group objects, materials and living things, with help, according to simple observational features.	Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns.	Talk about criteria for grouping, sorting and categorising, beginning to see patterns and relationships.	Identify similarities/differences/changes when talking about scientific processes. Use and begin to create simple keys.	Use and develop keys to identify, classify and describe living things and materials.	Identify and explain patterns seen in the natural environment.
Engaging in practical enquiry (investigating)	Engage in open-ended activities.	Follow instructions to complete a simple test individually or in a group.	Do things in the correct order when performing a simple test and begin to recognise when something is unfair.	Discuss enquiry methods and describe a fair test	Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables.	Plan a range of science enquiries, including comparative and fair tests.	Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why, in a variety of comparative and fair tests.
Recording and reporting findings	Record information collected in a variety of ways including photos, drawings, discussion with adult.	Begin to record simple data. Talk about their findings and explain what they have found out.	Gather data, record and talk about their findings, in a range of ways, using simple scientific vocabulary.	Record their findings using scientific language and present in note form, writing frames, diagrams, tables and charts.	Choose appropriate ways to record and present information, findings and conclusions for different audiences (e.g. displays, oral or written explanations).	Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models.	Choose the most effective approach to record and report results, linking to mathematical knowledge.

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<p>Drawing conclusions</p>	<p>Talk about similarities and differences in relation to places, objects, materials and living things (UTW ELG).</p> <ul style="list-style-type: none"> ● Answer 'how' and 'why' questions about their experiences and in response to stories or events (CLL – U – ELG). ● Explain why some things occur (CLL – U – EXC). ● Know that the environment and living things are influenced by human activity (UTW – EXC). ● Talk about things have changed (UTW ELG). 	<p>Explain, with support, what they think they have found out.</p>	<p>Use simple scientific language to explain what they have found out</p>	<p>Draw, with support, a simple conclusion based on evidence from an enquiry or observation</p>	<p>Use recorded data to make predictions, pose new questions and suggest improvements for further enquiries.</p>	<p>Use a simple mode of communication to justify their conclusions on a hypothesis. Begin to recognise how scientific ideas change over time.</p>	<p>Identify validity of conclusion and required improvement to methodology. Discuss how scientific ideas develop over time.</p>
<p>Analysing data Evaluating and raising further questions and predictions</p>		<p>Use every day or simple scientific language to ask and/or answer a question on given data.</p>	<p>Identify simple patterns and/or relationships using simple comparative language.</p>	<p>Gather, record and use data in a variety of ways to answer a simple question.</p>	<p>Identify, with help, changes, patterns, similarities and differences in data to help form conclusions. Use scientific evidence to support their findings</p>	<p>Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.</p>	<p>Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion.</p>
Working Scientifically – key vocabulary							
Key Stage 1			Lower Key Stage 2			Upper Key Stage 2	
experience observe			develop enquiry			variables evidence	

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<p>changes patterns grouping sorting classifying compare identify (name) data measure record equipment questions test investigate explore magnifying glass / hand lens same different</p>	<p>practical enquiry fair test comparative test relationships conclusion accurate thermometer data logger estimate data diagram key (identifying) table chart bar chart results predictions explanation reason similarity difference question evidence information findings criteria values properties characteristics</p>	<p>justify accuracy precision scatter graphs bar graphs line graphs argument (science) causal relationship</p>
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living things and habitats	Children know about similarities and differences in relation to places, objects, materials and living things. (Understanding of the World – The World ELG)		<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 their 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>		<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>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p>	<p>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.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>
Living Things and Their Habitats – Substantive Knowledge							
Year 1		Year 2			Year 3		
		<ul style="list-style-type: none"> • Everything is either living, dead or has never been alive. • There are 7 characteristics of living things: movement, respiration, sensitivity, growth, reproduction, excretion and nutrition. These can be remembered using the acronym: MRS GREN. • Different habitats are suited to different plants and animals i.e. forest, ocean, desert, woodland. 					

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	<ul style="list-style-type: none"> Habitats provide for the basic needs of the animals and plants that live there, such as food and shelter. A food chain shows how animals get food from plants and other animals. There are different sources of food e.g. crops, plants, trees, meat and milk from animals. Living things depend on each other to survive. Mammals, reptiles, amphibians, birds and fish can be found in habitats which are suited to them. Microhabitats are small habitats where mini beasts may live (e.g. under a rock, under leaves). 	
Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Living things can be divided into groups based upon their characteristics Vertebrate animals can be put into groups such as fish, amphibians, reptiles, birds, and mammals Invertebrates into snails and slugs, worms, spiders, and insects. Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. Environmental change affects different habitats differently. Different organisms are affected differently by environmental change. Human activity significantly affects the environment. Positive impacts - the positive effects of nature reserves, ecologically planned parks, or garden ponds. Negative impacts – negative effects of population and development, litter or deforestation. 	<ul style="list-style-type: none"> A lifecycle is the journey of changes that take place throughout the life of a living thing including birth, growing up and reproduction. Different types of organisms have different lifecycles. Humans develop inside their mothers and are dependent on their parents for many years until they are old enough to look after themselves. Amphibians such as frogs are laid in eggs then, once hatched, go through many changes until they become an adult. Some animals, such as butterflies, go through metamorphosis to become an adult. Birds are hatched from eggs and are looked after by their parents until they are able to live independently. 	<ul style="list-style-type: none"> Broad groupings, such as micro-organisms, plants and animals can be subdivided. Animals can be classified into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). A classification key is a set of questions about the characteristics of living things. A classification key helps to identify a living thing or decide which group it belongs to by answering questions. Variation exists within a population (and between offspring of some plants) <p>NB: this is duplicated in Year 6 Evolution and Inheritance.</p> <ul style="list-style-type: none"> Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms are best adapted to reproduce are more likely to do so. Organisms reproduce and offspring have similar characteristic patterns.

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Know about similarities and differences in relation to places, objects, materials and living things. (Understanding of the World – The World ELG)	Identify and name a variety of common wild & garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants			

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	<p>'Recognise some environments that are different from the one I live in.'</p>	<p>flowering plants, including trees.</p>	<p>to grow and stay healthy.</p> <p>Explore the process of germination</p>	<p>for life and growth (air, light, water, nutrients from soil, & 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 a flowering plant, including pollination, seed formation and seed dispersal.</p>		
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Plants – Substantive Knowledge

Year 1	Year 2	Year 3
<ul style="list-style-type: none"> • Garden plants are ones that are chosen • Deciduous trees lose their leaves in winter; evergreen tree keep their leaves all year • Name the petal, stem, leaves and root of a plant • Name the roots, trunk, branches and leaves of a tree. • Roots take in water and hold the plant in the ground. • The stem carries the water and nutrients from the roots to the leaves and flowers. • Leaves catch sunlight to help the plant to make its own food. • Flowers attract insects and birds. Petals are the colourful part of a flower. • Fruit contains the plant's seeds. <p>Seeds and bulbs grow into new plants.</p>	<ul style="list-style-type: none"> • Plants are living things that use sunlight to make their own food. • Every plant needs water to grow and survive. • Plants need sunlight to grow well. • All plants need the right temperature to grow well. • Seeds and bulbs can germinate and sprout underground without sunlight because they have a store of food inside the bulb/seed. 	<ul style="list-style-type: none"> • Plants are producers: they make their own food • Roots take in water and nutrients from the soil and keep the plant in the ground. • The stem holds the plant up and carries the water and nutrients from the roots to the leaves and flowers. • Leaves absorb sunlight and carbon dioxide to help the plant to make its own food. • Flowers attract insects and birds. • Plants need: water, light, nutrients from the soil, air and room to grow. • Different plants vary in how much of these things they need e.g. cacti can survive in areas with little water, whereas water lilies need to live in water. • Seeds/bulbs require the right conditions to germinate and grow. • Seeds contain enough food for the plant's initial growth. • 1.The roots absorb water from the soil. 2.The stem transports water to the leaves. 3.Water evaporates from the leaves. 4.This evaporation causes more water to be sucked up the stem.

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		<ul style="list-style-type: none"> Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production Seed dispersal – the fully formed seeds are moved away from the parent plant. Germination – The seed starts to grow. Growing and flowering – The plant grows bigger and forms a flower. Pollination – pollen from the anther lands on the stigma and travels down the style. Fertilisation and seed formation – the pollen joins with an ovule and a seed starts to form.
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans	Children know about similarities and differences between themselves and others. (Knowledge of the World - People and Communities ELG)	<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>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds & mammals, including pets).</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>Notice that animals, including humans, have offspring which grow into adults.</p> <p>Find out about and describe the basic needs of animals, including 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>	<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>Identify that humans and some 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>	Describe the changes as humans develop to old age.	<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>Recognise 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>
Animals including Humans – Substantive Knowledge							
Year 1		Year 2			Year 3		

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<ul style="list-style-type: none"> • Amphibians live the first part of their lives in the water and the last part on the land. • Reptiles are cold-blooded animals and they lay eggs. Reptiles live on land and in water. • All mammals have hair, lungs, are warm blooded and can live on land or in water. • Most mammals give birth to live babies but there are a few mammals who lay eggs. • A fish uses its gills to breathe, they have scales and lay soft eggs. • Birds lay eggs and have a beak, they all lay eggs but not all birds can fly. • Animals that eat only animals (or meat) are called carnivores. • Animals that eat only plants are called herbivores • An omnivore is an animal that eats animals and plants. • All living things breathe, eat, grow, move, reproduce and have senses. • Non-living things do not eat, grow, breathe, move and reproduce. They do not have senses • Our eyes help us to see. • Our ears help us to hear. • Our nose helps us to smell. • Our hands help us to feel <p>Our mouth/tongue helps us to taste.</p>	<ul style="list-style-type: none"> • Animals including humans reproduce when they reach maturity. • All animals including humans will eventually die. • Exercise keeps animals including humans, bodies in good condition and increases survival chances. • Animals move in order to survive. • Different animals move in different ways to help them survive. <p>Animals including humans need air, water, food and shelter to survive.</p>	<ul style="list-style-type: none"> • Different animals are adapted to eat different foods. • Plants can make their own food using the energy from sunlight, however animals, including humans need to eat in order to stay alive. • Humans need to eat different types of food. • We can place food into five food groups according to how they help us to stay healthy: <ul style="list-style-type: none"> ○ Bread, cereal and potatoes (carbohydrates) ○ Fruits and vegetables (vitamins and minerals) ○ Meat and fish (protein) ○ Milk and dairy (calcium) ○ Fats and sugars. • It is important to eat the right amount of food from each group. • We can measure food using portions • Humans and many animals have skeletons to support their bodies and protect vital organs. • Muscles are connected to bones and move them when they contract. <p>Movable joints connect bones</p>
Year 4	Year 5	Year 6
<ul style="list-style-type: none"> • The oesophagus is a muscular tube which moves food from the mouth to the stomach. • The stomach is an organ in the digestive system where food is broken down with stomach acid and by being churned around. • The small intestine is part of the intestine where nutrients are absorbed into the body. • The large intestine is part of the intestine where water is absorbed from remaining waste food. • Faeces are formed in the large intestine. • Incisors bites and cuts. • Canines tears and rips. • Molars grind and premolar hold and crushes. Some people have wisdom teeth but they have no function now 	<ul style="list-style-type: none"> • Prenatal – cells develop and grow into a foetus inside the mother’s uterus. • After around 9 months, the baby is born. • Infancy – rapid growth and development. Children learn to walk and talk. • Childhood – children learn new skills and become more independent. • Adolescence – The body starts to change over a few years. The changes occur to enable reproduction during adulthood. • Early adulthood – the human body is at its peak of fitness and strength. • Middle adulthood – ability to reproduce decreases. There may be hair loss or hair may turn grey. 	<ul style="list-style-type: none"> • The heart is an organ which constantly pumps blood around the circulatory system. • The heart pumps blood to the lungs to get oxygen. It then pumps this oxygenated blood around the body. • Blood vessels are the tube-like structures that carry blood through the tissues and organs. • Veins, arteries and capillaries are the three types of blood vessels. • Oxygenated blood has more oxygen, it is pumped from the heart to the rest of the body. • Deoxygenated blood is blood where most of the oxygen has already been transferred to the rest of the body. • Drugs, alcohol and smoking have negative effects on the body.

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<ul style="list-style-type: none"> A producer is an organism, such as a plant, that produces its own food. A predator is an animal that hunts and eats other animals. Prey is an animal that gets hunted and eaten by another animal. 	<ul style="list-style-type: none"> Late adulthood – leading a healthy lifestyle can help slow down the decline of fitness and health with occurs during this stage. Girls – larynx (voice box grows); hair grows under armpits; skin becomes oilier; breasts grow; gain hair on arms and legs; start to menstruate; pubic hair grows. Boys – larynx (voice box) grows ‘Adam’s apple’; hair grows on chest; pubic hair grows; skin becomes oilier; facial hair grows; hair under armpits grow; gain hair on arms and legs; scrotum, testes and penis develop; become more muscular. Both – grow taller; sweat glands produce more sweat; all parts of the body grow. 	<ul style="list-style-type: none"> A healthy diet involves eating the right types of nutrients in the right amounts. Regular exercise strengthens muscles including the heart muscle, improves circulation, increases the amount of oxygen around the body, releases brain chemicals which help you feel calm and relaxed, helps you sleep more easily, and strengthens bones. It can even help to stop us from getting ill. Nutrients are found in food and water, once broken down, the nutrients are absorbed into the blood in the small intestine. There are tiny hair like villi that help this process happen. The nutrients are carried in the blood to the different parts of the body that need them. Water doesn’t need breaking down and moves between membranes in the body to arrive in the correct place, again via our blood.
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Evolution and inheritance</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>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>Evolution and Inheritance – Substantive Knowledge</p>							

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Year 4	Year 5	Year 6
		<p>Evolution is the process by which living things gradually change over time.</p> <p>Fossils provide information about living things from millions of years ago.</p> <p>Organisms reproduce and offspring have similar characteristic patterns. Over time the characteristics that are most suited to the environment become increasingly common.</p> <p>Organisms best suited to their environment are more likely to survive long enough to reproduce. Variation exists within a population (and between offspring of some plants).</p> <p>Charles Darwin went on a voyage as a naturalist on the HMS Beagle. Charles Darwin went to the Galapagos Islands and studied the finches that inhabited the island and found that in different areas of the island finches had different beaks (e.g. shapes and sizes).</p> <p>Charles Darwin is known for his theory of evolution by natural selection – this was recorded in his book, On The Origin of Species.</p>

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
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>			

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Rocks – Substantive Knowledge

Year 1	Year 2	Year 3
		<ul style="list-style-type: none"> Igneous rock is rock that has been formed from magma or lava. Sedimentary rock is rock that has been formed by layers of sediment being pressed down hard and sticking together, you can see the layers of sediment in the rock. Metamorphic rock is rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure. A fossil is formed when layers of rock cover an animal. Only hard parts of the creature remain, e.g. bones, shells and teeth. Over thousands of years, sediment might enter the mould to make a cast fossil. Bones may change to mineral but will stay the same shape. Changes in sea level take place over a long period. As erosion and weathering take place, eventually the fossil becomes exposed. Soil is the uppermost layer of the Earth. It is a mixture of different things: minerals (the minerals in soil come from finely broken-down rock), air, water, organic matter (including living and dead plants and animals). Each rock type is formed within the rock cycle and rocks have different sizes of grain or crystal.

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Everyday materials	Children know about similarities and differences in relation to places, objects, materials and living things. (Understanding of the World – The World ELG)	<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 and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of</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 the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>				

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		everyday materials on the basis of their simple physical properties.				
Everyday Materials – Substantive Knowledge						
Year 1	Year 2			Year 3		
<ul style="list-style-type: none"> Objects are things that you can touch or see. Objects are made from different materials. Objects feel and look different based on the material they are made from. Some materials that objects are made from are: glass, wood, paper, metal, water, rock and plastic. Some words to describe materials are: shiny, soft, rough, bendy, hard, flexible, rigid, waterproof and absorbent. The properties of a material can make it useful for a range of different purposes Different materials can share the same properties. 	<ul style="list-style-type: none"> Different materials are used for different purposes. Materials can be changed by physical force. The shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching Suitability means having the properties which are right for a specific purpose, e.g. metal, wood and plastic are all suitable materials for spoons. Objects can be made using a range of materials including: wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Objects can be either manmade or naturally occurring. Object through which light can pass easily are called transparent objects Objects through which light can pass partially are called translucent objects The objects which do not allow the light to pass through are called opaque. 					

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Properties of Materials and Changing State					<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</p>	<p>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>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p>	

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					<p>the water cycle and associate the rate of evaporation with temperature.</p>	<p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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.</p>
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Properties of Materials and Changing State – Substantive Knowledge

Year 4	Year 5	Year 6
<ul style="list-style-type: none"> All things are made up of particles which are arranged differently in solids, liquids and gases. Solids, liquids and gases are described by observable properties. Particles in a solid are close together and cannot move. They can only vibrate. Particles in a liquid are close together but can move around each other easily. Particles in 	<ul style="list-style-type: none"> Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency. Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by: Sieving - Smaller materials are able to fall through the holes in the sieve, 	

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<p>a gas are spread out and can move around very quickly in all directions.</p> <ul style="list-style-type: none"> • Materials can change state when they are heated or cooled. • Cooling causes gases to condense into liquids and liquids to freeze into solids. When water and other liquids reach a certain temperature, they change state into a solid or a gas. The temperatures that these changes happen at are called the boiling, melting or freezing point. • Melting and freezing are a state change between solids and liquids. • Melting and freezing occur at different temperatures for different materials. • Water freezes at 0°C and boils at 100°C. • Condensation is a state change from a gas to a liquid. • Evaporation is a state change from liquid to gas. • Boiling and evaporation are the same state change from liquid to gas but at different temperatures. • The speed of evaporation depends on a number of variables including the temperature. • Evaporation and condensation occur in the water cycle and associate the rate of evaporation with temperature. • Condensation and evaporation occur within the water cycle. <ol style="list-style-type: none"> 1. Water from lakes, puddles, rivers and seas is evaporated by the sun's heat, turning it into water vapour. 2. This water vapour rises, then cools down to form water droplets in clouds (condensation). 3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (precipitation). 	<p>separating them from larger particles. Filtering - The solid particles will get caught in the filter paper but the liquid will be able to get through Evaporating -The liquid changes into a gas.</p> <ul style="list-style-type: none"> • Some changes results 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. • Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic. • Dissolving, mixing and changes of state are reversible changes. • Some materials will dissolve in liquid to form a solution. • A solution is made when solid particles are mixed with liquid particles. Materials that will dissolve are known as soluble. Materials that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve. • A substance can be recovered from a solution through evaporation. 	
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
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</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>

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				<p>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 change.</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>
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Light – Substantive Knowledge

Year 1	Year 2	Year 3
		<ul style="list-style-type: none"> We need light in order to see things and that dark is the absence of light. Light is reflected from surfaces. Light from the sun can be dangerous and that there are ways to protect their eyes. The pupils control the amount of light entering the eyes. If too much light enters, then it can damage the retina. To help protect the eyes, you can wear a hat with a wide brim and sunglasses with a UV rating. Shadows are formed when the light from a light source is blocked. Shadows of transparent, opaque and translucent materials vary. A shadow is caused when light is blocked by an opaque object. A shadow is larger when an object is closer to the light source. This is because it blocks more of the light.
Year 4	Year 5	Year 6
		<ul style="list-style-type: none"> Light travels in straight lines. Light from the sun travels in a straight line and hits an object. The light ray is then reflected off the objects and travels in a straight line to our eyes, enabling us to see the object Objects are seen because they give out or reflect light into the eye. A shadow is always the same shape as the object that casts it. This is because when an opaque object is in the path of light

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		<p>travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling.</p> <ul style="list-style-type: none"> • Convex Mirror is a curved mirror where the reflective surface bulges out toward the light source. This bulging-out surface reflects light outwards • Concave means "hollowed out or rounded inward". It inverts any image reflected in it. • Refraction happens when light changes direction, or bends, when it moves from one material to another.
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound	Look closely at similarities, differences, patterns and change e.g. exploring sounds made by different instruments				<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound increases.</p>		

Sound – Substantive Knowledge

Year 4	Year 5	Year 6
<ul style="list-style-type: none"> • Sound is a type of energy. Sounds are created by vibrations. The louder the sound, the bigger the vibration. • Inside your ear, the vibrations hit the eardrum and are then passed to the middle and then the inner ear. They are then 		

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<p>changed into electrical signals and sent to your brain. Your brain tells you that you are hearing a sound.</p> <ul style="list-style-type: none"> • Pitch is a measure of how high or low a sound is. A whistle being blown creates a high-pitched sound. A rumble of thunder is an example of a low-pitched sound. • The size of the vibration is called the amplitude. • Louder sounds have a larger amplitude, and quieter sounds have a smaller amplitude. • When sound vibrations spread out over a distance, the sound becomes quieter, just like ripples in a pond. 		
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Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal Change and Earth and Space		<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p>				<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 and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	

Seasonal Change and Earth and Space – Substantive Knowledge

Year 1	Year 2	Year 3
<ul style="list-style-type: none"> • The seasons are: Autumn – September, October, November Winter – December, January, February Spring – March, April, May Summer – June, July, August 		

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<ul style="list-style-type: none"> Some features that change throughout the year that are caused by change in weather e.g. numbers of mini beasts found outside, seed and plant growth, leaves on trees, clothes worn by people, hours of sunshine Days are longer and hotter in summer and colder and shorter in winter There are lots of different types of weather: rain, sun, cloud, wind, snow, hail. 		
Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> There are eight planets in the solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Pluto is no longer classed as a planet. The sun is a star at the centre of the solar system. The sun, moon and the Earth are astronomical objects shapes like spheres Earth rotates (spins) on its axis. It does a full rotation once in every 24 hours. At the same time that Earth is rotating, it is also orbiting (revolving) around the Sun. It takes a little more than 365 days to orbit the Sun. Daytime occurs when the side of Earth is facing towards the Sun. Night occurs when the side of Earth is facing away from the Sun The Moon orbits Earth in an oval- shaped path while spinning on its axis. At various times in a month, the Moon appears to be different shapes. This is because as the Moon rotates round Earth, the Sun lights up different parts of it. Lunar cycles take 28 days Meteors are rocks that fly through space 	

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces and magnets				<p>Compare how 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>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction</p>	

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				<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.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p>that 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>	
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Forces and Magnets – Substantive Knowledge

Year 1	Year 2	Year 3
		<ul style="list-style-type: none"> Different surfaces create different amounts of friction. The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object, and the force between them. A force that acts between two surfaces or objects that are moving, or trying to move, across each other. Magnetic force can act at distance. Magnets produces a magnetic force that pulls certain objects towards it. Objects which are attracted to a magnet are magnetic. Objects containing iron, nickel or cobalt metals are magnetic Objects which are attracted to a magnet are magnetic. Objects containing iron, nickel or cobalt metals are magnetic. North and south poles are found at different ends of a magnet. Repulsion is a force that pushes objects away. For example, when a north pole is placed near the north pole of another magnet, the two poles repel (push away from each other).

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Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> • Isaac Newton is known for the formulation of gravitational theory. • Gravity is a pulling force exerted by the Earth (or anything else which has mass). Earth's gravitational pull is the pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's gravitational pull which keeps us on the ground. Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. • Friction is a force against motion caused by two surfaces rubbing against each other. • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. 	

Overview	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
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 a circuit and associate this with</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 the bulb, 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>

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					<p>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.</p>	
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Electricity – Substantive Knowledge

Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Electricity is a form of energy, used for lighting, heating, making sound and making machines and appliances work. A source of electricity (mains or battery) is needed for electrical devices to work. Some appliances run on electricity; some plug into the mains electricity and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. Names of components include cells, wires, bulbs/ lamps, switches and buzzers. Scientists use symbols to represent components in a circuit diagram when drawing them. A cell is a single unit, and a battery is a collection of cells. A series circuit is where all the components of the circuits are joined in one loop. If one part of the loop is incomplete, then the circuit will not work Switches open and close circuits. When a switch is open the bulb/lamp will not light up as the series circuit is incomplete. Wires are made from metals as they are good conductors of electricity e.g. Iron, copper and steel Insulators are materials that do not allow electricity to pass through them easily e.g., plastic, wood, rubber and glass. Thomas Edison invented the first practical incandescent light bulb A conductor of electricity is a material that will allow electricity to flow through it. Metals are good conductors. Materials that are electrical insulators do not allow electricity to flow through them. Wood, plastic and glass are good insulators. 		<ul style="list-style-type: none"> Electric current is measured in amperes, current is a flow of charge. More batteries or a higher voltage create more power to flow through the circuit. Shortening the wires means the electrons have less resistance to flow through. The brightness of a bulb is increased when more voltage is added to a circuit. The length of wire affects the brightness of a bulb. Fewer batteries or a lower voltage give less power to the circuit. More buzzers or bulbs mean the power is shared by more components. Lengthening the wires means the electrons have to travel through more resistance. Electrical. Resistance is a measure of the opposition to current flow in an electrical circuit.

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