



Progression Document for Scientific Knowledge and Understanding

Plants				
	Year 1 Introduction to plants	Year 2 Plant Growth	Year 3 Plant Reproduction	Enrichment opportunities and links to WGS curriculum
Plant structure and function	<p>To know a variety of common plants, and how they differ.</p> <p>To know that deciduous trees lose their leaves seasonally, but evergreen trees do not.</p> <p>To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.</p>		<p>To understand the functions of the basic parts of a plant and the relationship between structure and function.</p> <p>To know that water is transported within a plant from the root, through the stem, to the leaves.</p>	<p>Various opportunities to explore plants within the school grounds.</p> <p>Art Foundation – Paint my world unit</p> <p>Art Y4– Fabric of nature unit</p>
Plant growth and needs	<p>To begin to understand how plants grow and change over time.</p>	<p>To know that seeds and bulbs grow into seedlings by producing roots and shoots.</p> <p>To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits.</p> <p>To know that seeds need water to germinate.</p> <p>To know that plants need water, light and a suitable temperature for growth and health.</p>	<p>To know that plants need water, light, air, nutrients/fertilizer and a suitable temperature for growth and health.</p> <p>To understand that the needs for growth and health vary from plant to plant.</p>	

Plant life cycles

Foundation – To begin to understand the key features of the lifecycle of a plant.

- To know the life cycle of a plant from seed to mature plant.
- To know that flowers are the reproductive organ of a plant.
- To know that the process of pollination is the transfer of pollen to the female (part of the) flower.
- To know that the process of seed formation is the growth of a seed after pollination/fertilisation.
- To know some different methods of seed dispersal and the benefits of each.

Animals, including humans				
	Year 1 Sensitive Bodies Comparing Animals	Year 2 Life Cycles and Health	Year 3 Movement and Nutrition	Enrichment opportunities and links to WGS curriculum
Animal growth	<p>To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).</p> <p>Foundation – To begin to understand the key features of the lifecycle of a butterfly and a duck.</p>	<p>To understand how living things change, and that animals have offspring that grow into adults.</p> <p>To know which offspring comes from which parent animal.</p> <p>To know the stages in some animal life cycles.</p>		<p>Foundation visit to Mead Open Farm and Y1 visit to Whipsnade Zoo.</p> <p>Living Eggs in school.</p> <p>Mobile Farm visit to school.</p>
Animal structure and function	<p>To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell)</p> <p>To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth).</p> <p>To know the five main senses: sight, smell, hearing, taste and touch.</p> <p>To know that the skin is used for touch, the tongue is used for taste, the nose is used for smell, the eyes are used for sight and the ears are used for hearing.</p>		<p>To know that animals can be grouped based on the presence of a skeleton.</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 system in humans and some animals works with the skeleton for movement.</p> <p>To know the main bones in the body.</p>	<p>Y3 visit to Oxford Natural History Museum.</p> <p>PSHE – Y1 Looking after animals</p>
Health and nutrition	<p>To know that a carnivore is an animal that eats other animals and give some examples.</p> <p>To know that a herbivore is an animal that eats only plants and give some examples.</p> <p>To know that an omnivore is an animal that eats both animals and plants, and to give some examples.</p>	<p>To know that animals, including humans, need water, food and air to survive.</p> <p>To understand the importance of exercise, a balanced diet and hygiene for humans.</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 the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions.</p> <p>To know that a balanced diet should include all food groups. To describe the diets of different animals.</p>	

	Year 4 Digestion and food	Year 5 Human timeline	Year 6 Circulation and health	Enrichment opportunities and links to WGS curriculum
Animal growth		<p>To describe the human life cycle, 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>PSHE – Y5 Safety and the changing body.</p> <p>PSHE – Y4 health and wellbeing unit, teeth</p> <p>History – Y3 Would you prefer to live in the Stone Age, Iron Age or Bronze Age?</p>
Animal structure and function	<p>To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions.</p> <p>To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.</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.</p> <p>To know that the blood vessels transport blood around the body.</p> <p>To know that the blood transports vital substances around the body, including oxygen and nutrients.</p> <p>To understand the relationships between different organ systems.</p>	

Health and Nutrition	<p>To know that teeth can be damaged, including the effect of sugary and acidic food.</p> <p>To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly.</p> <p>To describe the teeth of carnivores and herbivores, and understand why they are different.</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 know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.</p>		<p>To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions.</p> <p>To know that the heart rate is the number of beats per minute and breathing rate is the number of breaths per minute.</p> <p>To know that exercise increases heart and breathing rates.</p>	
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Living things and their habitats

	Foundation Out of this world Enchanted Forest	Year 2 Habitats Microhabitats	Year 4 Classification and changing habitats	Enrichment opportunities and links to WGS curriculum
Characteristics of living things	<p>To begin to understand what hibernation means.</p> <p>To describe what pupils can see, hear and feeling whilst outside using a range of vocabulary.</p>	<p>To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.</p> <p>To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.</p>	<p>To know that living things can be grouped in different ways.</p> <p>To know that a classification key can be used to group and identify plants and animals.</p> <p>To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone.</p> <p>To know that plants can be grouped into flowering or non-flowering varieties.</p> <p>To know that flowering plants include grasses and non-flowering plants includes ferns and mosses.</p> <p>To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish.</p> <p>To know that invertebrate groups include snails, slugs, worms, spiders and insects.</p>	<p>Various opportunities to explore plants and creatures within the school grounds.</p> <p>Y3 visit to Oxford Natural History Museum.</p> <p>Y2 visit to the Sealife Centre, Birmingham.</p> <p>Geography – Y4 Why are rainforests important to us?</p> <p>Geography – Y3 Who lives in Antarctica?</p> <p>Geography – Y5 What is life like in the Alps? Why do oceans matter? Would you like to live in the desert?</p>
Variation and inheritance		<p>To know a variety of plants and animals and describe some differences.</p>		

Habitats and interdependence	To begin to understand what a habitat is.	<p>To name a variety of habitats, including woodland, ocean, rainforest and seashore.</p> <p>To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive.</p> <p>To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter).</p> <p>To know that living things depend upon each other (e.g. for food, shelter.)</p> <p>To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.</p>	<p>To know that habitats can change throughout the year and this can be dangerous for living things.</p> <p>To know that humans can have both a positive and negative impact on the environment.</p>	
		<p>Year 5</p> <p>Life cycles and reproduction</p>	<p>Year 6</p> <p>Classifying big and small Evolution and inheritance</p>	<p>Enrichment opportunities and links to WGS curriculum</p>
Characteristics of living things			<p>To know that 'organism' is a term used to refer to an individual living thing.</p> <p>To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye.</p> <p>To know the characteristics of the different groups of vertebrates and commonly found invertebrates.</p>	<p>Y3 visit to Oxford Natural History Museum.</p> <p>RSE – Y5 and Y6 Safety and the changing body.</p>

Variation and inheritance		<p>To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again.</p> <p>To know that all living things must reproduce for the species to survive.</p> <p>To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent.</p> <p>To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).</p>	<p>To know that living things have changed over time.</p> <p>To know that fossils provide us with information about living things that inhabited the Earth millions of years ago.</p> <p>To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents.</p> <p>To know that over time, variation in offspring can affect animals' chances of survival in particular environments.</p>	
Habitats and interdependence			<p>To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.</p>	

Materials				
	Foundation Traditional Tales	Year 1 Everyday materials	Year 2 Uses of everyday materials	Enrichment opportunities and links to WGS curriculum
Identifying and naming	<p>To begin to name some materials and compare them using senses.</p> <p>To observe a range of materials in water.</p>	<p>To know that objects are items or things.</p> <p>To know that a material is what an object is made from.</p> <p>To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</p>		<p>Geography – Foundation outdoor adventures.</p> <p>Geography – Y6 Where does our energy come from?</p> <p>Y5 – Visit to Science Museum, London and Wonderlab.</p>
Properties and uses		<p>To know that property refers to how a material can be described.</p> <p>To describe the physical properties of a variety of everyday materials.</p> <p>To understand that materials can be grouped based on their physical properties.</p>	<p>To know why objects are made from particular materials and to give examples of their suitability.</p> <p>To know that one material can be used for a range of purposes (and to give examples.)</p> <p>To know that different materials can be used for the same purpose (and to give examples.)</p> <p>To know why certain materials are unsuitable for particular objects.</p>	
Change	<p>To understand some processes and changing states of matter e.g. ice in a warm environment.</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>	

	Year 3 Rocks and soils	Year 4 States of matter	Year 5 Mixtures and separation Properties and changes	Enrichment opportunities and links to WGS curriculum
Identifying and naming	<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.</p> <p>To know that grains and crystals appear differently and can be used to classify rocks.</p> <p>To know that soils are made from rocks and dead matter.</p>	<p>To know that all substances around us can exist as solids, liquids and gases.</p>		<p>Y3 visit to Natural History Museum, Oxford.</p> <p>Y5 visit to Science Museum, London and Wonderlab.</p>
Properties and uses	<p>To understand the relationship between the properties of rocks and their uses.</p>	<p>To know that a property of a solid is that it keeps its shape unless a force is applied to it.</p> <p>To know that a property of a liquid can flow freely and take on the shape of a container.</p> <p>To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.</p>	<p>To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.</p>	

Change	<p>To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.</p>	<p>To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating).</p> <p>To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).</p> <p>To know that water can exist as a solid, a liquid or a gas.</p> <p>To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.</p> <p>To know that water flows around the world in a continuous process called the water cycle.</p> <p>To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour.</p> <p>To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation.</p> <p>To know that the rate of evaporation increases as temperature rises.</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 and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)</p>	
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Energy				
	Light		Sound	Enrichment opportunities and links to WGS curriculum
	Year 3 Light and shadows	Year 6 Light and reflection	Year 4 Sound and vibration	
Sources	<p>To know that light travels from a source (e.g. the Sun, light bulbs and torches).</p> <p>To know that light is needed to see things and that dark is the absence of light.</p> <p>To know that light from the Sun can be dangerous and how to protect their eyes.</p>	<p>To know that light travels in a straight line from a light source.</p> <p>To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye.</p>	<p>To understand that sound is a result of vibrations.</p>	<p>Music Foundation, Exploring sound. Y1 – Pitch and tempo. Y2 – Dynamics, timbre, tempo and motifs. Y4 – Changes in pitch, tempo and dynamics. Y6 – Dynamics, pitch and tempo</p> <p>Mathematics - Measurement</p>
Transfer	<p>To know that all materials reflect light.</p> <p>To know that shadows are formed when the light from a light source is blocked by an opaque object.</p>	<p>To know that shiny surfaces reflect light uniformly.</p> <p>To know that when light is reflected off a surface, its direction changes.</p> <p>To know that mirrors and periscopes work using reflection of light on smooth surfaces.</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>To know that vibrations from sounds travel through mediums to the ear.</p> <p>To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds.</p> <p>To know that different materials provide different amounts of insulation against sound.</p>	
Factors affecting energy	<p>To know that shadows change as a result of different factors:</p> <ul style="list-style-type: none"> - Changing the position of the light source. - Changing the distances between the light source, object and surface. <p>To know that shadows change position and length throughout the day as the Sun changes position in the sky.</p>	<p>To understand how and why the distance between the object and the screen affects the size of the shadow.</p> <p>To understand how the angle of a reflected ray is affected by the angle of the incoming ray on a smooth surface.</p>	<p>To know a variety of ways to change the pitch or volume of a sound.</p> <p>To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.</p> <p>To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.</p> <p>To know that sounds get fainter as the distance from the sound source increases.</p>	

	Year 5 Electricity and circuits	Year 6 Circuits, batteries, switches		Enrichment opportunities and links to WGS curriculum
Sources	<p>To know that all electrical appliances need a power source, including batteries or mains electricity.</p> <p>To know that an electrical circuit needs a complete path for the electrical charge to flow through.</p> <p>To know the main components in a simple series circuit.</p> <p>To know the precautions for working safely with electricity.</p>	<p>To know a wider variety of components in a series circuit (including buzzer and motor).</p> <p>To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.</p>		<p>DT – Y3 Electronic charm, Y5 Torches and Y6 Steady hand game.</p> <p>Geography – Y6 Where does our energy come from?</p> <p>Music – Y5 Looping and remixing.</p> <p>Y5 visit to the Science Museum, London and Wonderlab.</p>
Transfer	<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 that metals are used for cables and wires because they are good conductors of electricity.</p> <p>To know that plastic is used to cover cables and wires because it is a good insulator.</p>			

Factors affecting energy	<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 (or buzzer volume).</p>		
Forces, Earth and space				
	Year 1 Seasonal changes	Year 5 Earth and space		Enrichment opportunities and links to WGS curriculum
Key facts	<p>To know the name and order of the four seasons; spring, summer, autumn and winter.</p> <p>To know that it is unsafe to look directly at the Sun.</p> <p>To understand how the natural world changes throughout the year.</p>	<p>To know that the Sun is a star at the centre of our solar system.</p> <p>To know that the Sun, Earth and Moon are approximately spherical bodies.</p> <p>To know the names, order and relative positions of the planets and other main celestial bodies.</p> <p>To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.</p>		<p>Y5 visit to the Science Museum, London and Wonderlab.</p> <p>Geography – Foundation Outdoor adventures, Y1 What’s the weather like in the UK? Y2 Would you prefer to live in a hot or cold place?</p> <p>Foundation – Out of this world unit</p>
Forces in motion	<p>To know the weather associated with the four seasons and how it changes (in the UK).</p> <p>To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.</p>	<p>To know that the Earth and other planets orbit around the Sun.</p> <p>To know that the tilt of the Earth and its orbit around the Sun causes the seasons.</p> <p>To know that the Moon orbits around the Earth.</p> <p>To understand how the Earth’s rotation causes day and night and the apparent movement of the Sun across the sky.</p>		

	Year 3 Forces and magnets	Year 5 Imbalances forces		Enrichment opportunities and links to WGS curriculum
Key facts	<p>To know some examples of contact and non-contact forces.</p> <p>To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism).</p> <p>To know the North and South poles of a magnet.</p> <p>To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other.</p> <p>To know some different examples of magnets, including bar, horseshoe, button and ring.</p> <p>To know some uses of magnets.</p>	<p>To know that gravity is a non-contact force that pulls objects together.</p> <p>To know that air resistance and water resistance are both types of friction.</p>		<p>DT – Y3 Pneumatic toys</p> <p>Y5 visit to the Science Museum London and Wonderlab</p>
Forces in motion	<p>To know that friction is a contact force that acts between two surfaces to slow an object down.</p> <p>To know that magnetism is a non-contact force that affects objects containing magnetic metal.</p> <p>To understand that the opposite poles of a magnet attract one another and like poles repel one another.</p>	<p>To know that unsupported objects fall towards the Earth because of gravity.</p> <p>To know that friction, air resistance and water resistance act in the opposite direction to a moving object.</p> <p>To know that when forces are imbalanced, the speed, shape or direction of an object changes.</p> <p>To know that when forces are balanced the speed, shape or direction of an object stays the same.</p> <p>To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p>		

Factors affecting forces	<p>To know that rougher surfaces have more friction between them than smoother surfaces.</p> <p>To understand that the strength of different magnets may vary.</p>	<p>To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement.</p> <p>To know that the larger the surface area of an object the greater the air or water resistance it creates.</p>		
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