

Medium Term Plan – SCIENCE – Year 4 Autumn 1 – **ANIMALS INCLUDING HUMANS****Overarching Enquiry Question: What do our bodies do with the food we eat?**

Length of unit - 5 Sessions

	Disciplinary and Substantive Knowledge	Suggested Vocabulary	Learning Sequence
Pre-learning	- The parts of the human body and what they do. - All animals need water, air and food to survive. - The different ways in which humans are healthy. - Animals get nutrition from what they eat. - Humans and some animals have skeletons and muscles for support, protection and movement. - What carnivores, omnivores and herbivores are.	Digestion Digestive System Intestine Oesophagus Rectum Stomach Mouth Teeth	Use a model to identify and demonstrate organs in the digestive system. (2 Sessions) Learning Food is digested when we eat it. Main parts of the digestive system in order: mouth, oesophagus, stomach, small intestine, large intestine, rectum. Food is broken down in the mouth and travels down the oesophagus to the stomach. Food is broken down further here. Food travels to the small intestine where nutrients are absorbed into the blood. It then travels to the large intestine where water is absorbed into the blood. Waste food is stored in the rectum. Activities WS: Interpret a model to demonstrate how the digestive system works. SE: Identify organs in the digestive system
Learning in this unit	<u>To know that</u> - The basic parts of the digestive system in humans have different functions. (L1, L2) - Animals have different types of teeth and their simple functions (L3, L4, L5) - Food chains can be constructed and interpreted to identify producers, predators and prey. (L6) <u>Working Scientifically</u> <u>To know how to</u>		
		<u>Asking Questions (L6)</u> Ask relevant questions and begin to recognize which type of scientific enquiry could be used to answer them.	
			
			
		<u>Observing and Measuring (L5)</u> Make accurate observations and measurements using a range of equipment, recording in standard units where appropriate.	Incisor Canine Molar
		<u>Recording Data (L3, L5)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.	
		<u>Interpreting and Communicating Results (L1, L2)</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.	
			Carnivore Herbivore Omnivore

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		Predator Prey Producer	Ask questions to research what animals eat and create food chains based on my findings. Learning <i>Energy is transferred when animals eat food – this can be represented through a food chain.</i> <i>Food chains start with a green plant – producer.</i> <i>Animals eaten by other animals are prey. An animal that eats another animal is called a predator.</i> Activities WS: Ask questions to find out what each animal eats. SE: Research what animals eat.										
Book/ Science Capital	John Hams Dentist												
Resources	• Small bowl, masher or fork, banana/plain biscuit or cracker, spoon, water, 25cm clear plastic tubing, clear sandwich bag, lemon juice, scissors, tights, tray, paper cups. • Mirrors, teeth model (optional), teeth mirrors if you have them, apple, baguette, jelly sweets/grapes. • Eggs, jars, water, tea/coffee, fizzy drink, vinegar, toothpastes x 3 types. • Optional lesson- baking soda, water, glycerine, salt, essential oil/flavouring. • Flour, salt, bicarb, vegetable oil, hot water, brown food colouring, mixing bowl, jugs, gloves + individual animal components (Can be real or plastic items - grass, hay, berries, insects, bones, shells [Egg and snail], corn, vegetables.)												

Overarching Enquiry Question: Is water always wet?

Length of unit - 6 Sessions

	Disciplinary and Substantive Knowledge	Suggested Vocabulary	Learning Sequence														
Pre-learning	Why some materials are used for certain purposes because of their properties	Solid Gas Liquid Matter	Identify and classify solids, liquids and gases based on their properties.														
Learning in this unit	<u>To know that</u> - Materials can be compared or grouped together, according to whether they are solids, liquids or gases. (L1, L2) - Some materials change state when they are heated or cooled, and I can measure or research the temperature at which this happens in degrees Celsius. (L3, L4) - Evaporation and condensation are part in the water cycle, and the rate of evaporation changes depending on temperature. (L5, L6) <u>Working Scientifically</u> <u>To know how to</u> <table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td><u>Setting up tests (L4).</u> Work in small groups to set up simple practical enquiries, comparative and fair tests.</td></tr><tr><td></td><td><u>Observing and Measuring (L1, L2).</u> Make accurate observations and measurements using a range of equipment, recording in standard units where appropriate.</td></tr><tr><td></td><td><u>Recording Data (L6)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.</td></tr><tr><td></td><td><u>Interpreting and Communicating Results (L3).</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.</td></tr><tr><td></td><td></td></tr></table>						<u>Setting up tests (L4).</u> Work in small groups to set up simple practical enquiries, comparative and fair tests.		<u>Observing and Measuring (L1, L2).</u> Make accurate observations and measurements using a range of equipment, recording in standard units where appropriate.		<u>Recording Data (L6)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.		<u>Interpreting and Communicating Results (L3).</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.			Melting Temperature Celsius	Conduct a fair test to investigate melting points and use a thermometer to take accurate measurements. <u>Learning</u> Heating a solid turns it into a liquid – this is called melting. Different materials have different melting points. <u>Activities</u> WS: Use a thermometer to take accurate measurements in °C) SE: Conduct a fair test to investigate melting points.
																	
																	
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Freezing		Observe what happens when a liquid changes to a solid and explain this using my scientific knowledge <u>Learning</u> Cooling a liquid turns it into a solid – this is called freezing. Different materials have different freezing points. Water freezes at 0°C <u>Activities</u> WS: Interpret what I have observed using scientific knowledge. SE: Observe what happens when a liquid changes to a solid.															

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Book/ Science Capital	Dr Pearl Agyakwa											
Resources	• Blu tac/plasticine • Post it notes • Balloons 3 per group. Tray • Scissors • Materials e.g. Talcum powder, flour, rice, milk, air freshener/aerosol, sand, toothpaste, juice, balloon with air, water etc. • Transparent bottle or beaker, • Latex gloves • Rubber band, White vinegar, Bicarb • Beaker/glass, Lemonade, raisins • Bag of ice, salt, milk or milk shake • Ziplock bags • Towel (optional) • Glass/mirror • Black paper, water • Wet paper towels or towels per group, string, pegs, fair test planning board. • Jar or bowl, cling film, water, ice, blue food colouring, zip lock pens, permanent markers.											

Overarching Enquiry Question: What can we do with electricity?

Length of unit - 6 Sessions

	Disciplinary and Substantive Knowledge	Suggested Vocabulary	Learning Sequence													
Pre-learning	- Some devices require electricity to work - Switches can turn devices off and on	Appliance Electricity Battery Mains	Say what an electrical appliance is and use electrical components to build and draw a working circuit.													
Learning in this unit	<u>To know that</u> - Common appliances run on electricity. (L1) - A simple series electrical circuit can be constructed through connecting cells, wires, bulbs, switches and buzzers. (L2, L3, L4) - A lamp may or may not light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. (L4) - A switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (L6) - Materials can be conductors and insulators, and associate metals with being good conductors. (L5) <u>Working Scientifically</u> <u>To know how to</u> <table><tr><td></td><td><u>Asking Questions (L3)</u> Ask relevant questions and begin to recognize which type of scientific enquiry could be used to answer them.</td></tr><tr><td></td><td><u>Making Predictions (L4)</u> Make predictions based on a range of data.</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td><u>Recording Data (L1, L5)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.</td></tr><tr><td></td><td><u>Interpreting and Communicating Results (L2)</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.</td></tr><tr><td></td><td><u>Evaluating (L6)</u> Evaluate and communicate their methods and findings.</td></tr></table>		<u>Asking Questions (L3)</u> Ask relevant questions and begin to recognize which type of scientific enquiry could be used to answer them.		<u>Making Predictions (L4)</u> Make predictions based on a range of data.						<u>Recording Data (L1, L5)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.		<u>Interpreting and Communicating Results (L2)</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.		<u>Evaluating (L6)</u> Evaluate and communicate their methods and findings.	Circuit Component Identify components in a circuit and explain their functions. <u>Learning</u> The basic elements of an electrical circuit are called components. A simple electrical circuit has to have an electrical source, such as a battery. A simple electrical circuit has to have wires for the electricity to flow through. A simple electrical circuit has to have a device, such as a bulb, buzzer or motor, that requires electricity to work. <u>Activities</u> WS: Communicate the functions of electrical components. SE: Name the components of a circuit. Circuit Complete Incomplete Use questioning and scientific knowledge to set up simple series circuits. <u>Learning</u> A complete electrical circuit is made when all components are connected together correctly. A series circuit is when all the components are in the same loop. <u>Activities</u> WS: Use scientific curiosity and questioning to explore simple circuits. SE: Use scientific knowledge and diagrams to help to set up a series circuit.
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Book/ Science Capital	Alessandro Volta Michael Faraday Oscar and the bird book											
Resources	• Post it notes. • Bulb, cells, wires for each child. • Oscar and the bird book (optional) read along included. • Cells, bulbs, wires, switches, motors, buzzer, batteries. • Energy ball/stick (optional). • Whiteboards/scrap paper (optional) • Range of materials e.g., Steel, rubber, gold, aluminium, sea water, oil, tin foil, copper, plastic, glass, iron. • Range of switches (optional) bulbs, wires, cells. Buzzers (optional) • Range of conductive materials e.g. Split pins, paperclips, wire, metal, nails, tin foil. • Cardboard, tape.											

Overarching Enquiry Question: How are different sounds made and heard?

Length of unit - 6 Sessions

	Disciplinary and Substantive Knowledge	Suggested Vocabulary	Learning Sequence
Pre-learning	- Hearing is one of my five senses. - Sounds can be made using musical instruments.	Sound Vibration	Identify how sounds are made by observing vibrations.
Learning in this unit	<u>To know that</u> - Sounds are made by something vibrating. (L1) - Vibrations from sounds travel through a medium to the ear. (L2) - There are patterns between pitch of a sound and features of the object that produced it. (L3, L4) - There are patterns between the volume of a sound and the strength of the vibrations that produced it. (L5, L6) - Sound gets fainter as the distance from the sound source increases (L6) <u>Working Scientifically</u> <u>To know how to</u>		<u>Learning</u> <i>Sounds are made when an object vibrates.</i> <i>If an object is not vibrating, it will not make a sound.</i> <i>We can sometimes see these vibration (tuning fork in water, rice on a drum skin) or feel them (speakers or vocal chords).</i>
			
			
			
	 <u>Observing and Measuring (L1, L3, L5)</u> Make accurate observations and measurements using a range of equipment, recording in standard units where appropriate.		
	 <u>Recording Data (L6)</u> Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables, keys and bar charts.		
	 <u>Interpreting and Communicating Results (L2, L4)</u> Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.		
			
		Sound Wave Medium	Use scientific diagrams to communicate how sounds travel to our ear. <u>Learning</u> <i>Sounds are heard when vibrations travel from the object through a medium to our ear.</i> <i>Vibrations create sound waves which are not visible in the air, but we can use diagrams to show how they travel.</i> <i>A medium can be a solid, a liquid, or a gas, such as a wall, water, or the air.</i> <u>Activities</u> WS: Show how sounds travel to our ear using a scientific diagram. SE: Plan a fair test to create the best string phone
		Pitch High Low	Identify and classify high and low pitch sounds. <u>Learning</u> <i>Pitch describes how high or low a sound is.</i> <i>Different objects produce different pitch sounds when they vibrate.</i> <u>Activities</u> WS: Identify high and low pitched sounds. SE: Classify high and low

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			Spot patterns when investigating pitch and draw a conclusion from my findings. Learning <i>The pitch of a sound tells you how 'high' or 'low' a note is. Shorter mediums produce sounds of a higher pitch. Longer mediums produce sounds of a lower pitch.</i> Activities WS: Explain how to create sounds of a different pitch. SE: Spot patterns in my results when investigating pitch										
		Volume Loud Quiet	Seek patterns and observe how vibrations change when the volume of a sound changes. Learning <i>Large vibrations create loud sounds and small vibrations create quiet sounds. Volume describes how loud or quiet a sound is. The volume of a sound can be changed.</i> Activities WS: Observe vibrations of different volumes. SE: Carry out a pattern seeking enquiry.										
		Source Decibels	Spot patterns between volume of a sound and the distance of the sound source and record my results using tables and line graphs. Learning <i>Sound is measured in decibels. Sounds get quieter as you move further away from the sound source.</i> Activities WS: Record results in a table and a line graph. SE: Spot patterns in results to make conclusions.										
Book/ Science Capital	Sound collector poem Alexander Graham Bell F1 engineers												
Resources	• Tuning fork, ping pong, bowl of water, rice, drum, metal coat hanger, string, balloon, radio/music, metal slinky. • Cups of different sizes and materials, string of different lengths, material and thickness. • Bottles, water, straws, rulers. • Trundle wheel, music source. • Range of pots and containers, elastic bands, rice, tins, balloons, lollypop sticks, bottles, water. • Range of materials for ear defenders. • (Optional lesson) paper, scissors, tape, music, paper plates, balloon, nut.												

Overarching Enquiry Question: Are living things in danger?

Length of unit - 6 Sessions

	Disciplinary and Substantive Knowledge	Suggested Vocabulary	Learning Sequence
Pre-learning	- Animals can be grouped into vertebrates (and then further into fish, reptiles, amphibians, birds and mammals). - Animals can be grouped into carnivores, herbivores and omnivores. - The names of some common wild and garden plants and deciduous and evergreen trees. - Examples of habitats (including microhabitats) and the animals and plants that can be found there. - Living things depend on each other to survive. - How food chains work.	Classify Characteristic	Observe the features of living things to classify them in different ways. Learning Living things can be classified based on similar characteristics, such as their appearances, habitats and diets. Scientists classify living things to help them understand how living things are related to and depend on each other. Activities WS: Observe the features of living things. SE: Identify different animals and classify them into different groups.
Learning in this unit	<u>To know that</u> - Living things can be grouped in a variety of ways. (L1, L2) - Classification keys can be used to help group living things. (L3) - There are a variety of living things in my local environment. (L4, L5) - Environments can change and this can sometimes pose dangers to living things. (L6) <u>Working Scientifically</u> <u>To know how to</u>		
	 Asking Questions (L5) Ask relevant questions and begin to recognize which type of scientific enquiry could be used to answer them.	Mammal Reptile Amphibian Fish Bird	Research and communicate the differences between animal vertebrate classification groups.
		Vertebrate	Learning Vertebrates are classified into five groups: amphibians, birds, fish, mammals and reptiles. Vertebrates can be classified by observing body covering and structure.
			Amphibians – smooth skin, gills (young) lungs (grown) Birds – feathers, lungs, wings, two legs
	 Observing and Measuring (L1, L3) Make accurate observations and measurements using a range of equipment, recording in standard units where appropriate.		Fish – fins, gills, scales Mammals –hair/fur, lungs
	 Recording Data (L4) Take increasing ownership of how data is gathered, recorded, classified and presented, using scientific drawings, tables keys and bar charts.		Reptiles – scales, lungs
	 Interpreting and Communicating Results (L2, L6) Report on findings orally and in writing using appropriate scientific vocabulary. Draw conclusions from results and use scientific evidence connected to the investigation to support ideas.		Activities WS: Communicate the characteristics of each vertebrate group. SE: Research characteristics of vertebrate groups.
	Classification key	Use a classification key to identify similarities and differences in living things characteristics. Learning Classification keys can be used to group and identify living things based on their	

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Book/ Science Capital	Steve Irwin Duffy's Lucky Escape Biologist	Invertebrate Habitat Microhabitats	Gather and record data about invertebrate habitats and spot patterns in my results. Learning There are many different species of invertebrate in the school environment – including but not inclusive of/limited to ants, spiders, bees, wasps, beetles, worms, woodlice. Different invertebrates prefer different microhabitats – included but not limited to dark/light, wet/dry, open/closed Activities WS: Gather, record and classify data on invertebrates. SE: Identify patterns by finding and identifying invertebrate habitats.										
Resources	• Doll (optional), camera, chalk, post it notes • Mini beast equipment e.g., pooters, umbrella, litter sieve, petri dishes, viewing tank, magnifying glasses. • Selection of leaves (or could use pictures). • Duffy's lucky escape book (optional) Bowl, oil, water, blue food colouring, feathers, milk, bottle, cress, soil, water, glitter, plastic animals, ice, lamp, A3 paper, colouring pens.		Ask relevant questions to create a classification key to classify living things. Learning The information that we discovered last session can be put into a classification key. This will help us to identify specific invertebrates based on their characteristics or habitats. Activities WS: Ask relevant questions to classify living things. SE: Create a classification key to identify and classify living things.										
		Endangered Environment Extinct	Use evidence and research to explain how animals can become endangered due to changing environments. Learning Human actions can impact and change environments. Ways that environments can change include: Pollution (oil spills and plastic and litter), climate change (melting ice caps and drought)										

			<i>and deforestation. Changing environments can cause animals to become endangered and/or extinct.</i> <u>Activities</u> <i>WS: Use evidence to answer questions. SE: Use research about endangered animals to show how environments can change.</i>
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