Year 4 - Animals, including humans

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct and interpret a variety of food chains, identifying producers, predators and prey	• Animals have teeth to help them eat. • Different types of teeth do different jobs. • Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. • The blood takes nutrients around the body. • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.	Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.

Key Scientists	Linked Texts
Ivan Pavlov (Digestive System Mechanisms) **Joseph Lister** (Discovered Antiseptics)	***Human Body Odyssey*** *(Werner Holzwarth)* ***Crocodiles Don't Brush Their Teeth*** *(Colin Fancy)* ***Wolves*** *(Emily Gravett)*

Prior Learning	Common misconceptions	Future Learning
In Year 3 children should: • Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat. • Know how nutrients, water and oxygen are transported within animals and humans. • Know about the importance of a nutritious, balanced diet. • Identify that humans and some other animals have skeletons and muscles for support, protection and movement:	Some children may think: • Arrows in a food chains mean 'eats' • The death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • There is always plenty of food for wild animals • Your stomach is where your belly button is • Food is digested only in the stomach • When you have a meal, your food goes down one tube and your drink down another • The food you eat becomes "poo" and the drink becomes "wee"	In Year 5 children will: • Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird. • Know the differences between different life cycles. • Know the process of reproduction in plants. • Know the process of reproduction in animals

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
In our class, are omnivores taller than vegetarians? Compare liquids and decay on 'teeth' TAPS	What are the names for all the organs involved in the digestive system? How can we organise teeth into groups?	How does an egg shell change when it is left in cola?	Are foods that are high in energy always high in sugar?	How do dentists fix broken teeth?

ear 4 - Living things and their habitats

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
• Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose danger to living things.	• Living things can be divided into groups based upon their characteristics • Environmental change affects different habitats differently • Different organisms are affected differently by environmental change • Different food chains occur in different habitats • Human activity significantly affects the environment	Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.	
		Key Scientists	**Linked Texts**
		Cindy Looy (Environmental Change and Extinction) **Jaques Cousteau** (Marine Biologist)	***The Vanishing Rainforest*** *(Richard Platt)* ***The Morning I Met a Whale*** *(Michael Morpurgo)* ***Journey to the River Sea*** *(Eva Ibbotson)*

Prior Learning	Common misconceptions	Future Learning
In Year 2, children should: • Explore and compare the difference between things that are living, dead and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food.	Some children may think: • The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain • There is always plenty of food for wild animals • Animals are only land-living creatures • Animals and plants can adapt to their habitats, however they change • All changes to habitats are negative.	In Year 5 (Animals, Including Humans): • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • Describe the life process of reproduction in some plants and animals. In Year 6 (Living things & their Habitats): • Classify living things into broad groups according to observable characteristics and based on similarities and differences. • Give reasons for classifying plants and animals based on specific characteristics.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water change in each season?	Group living things in diff. ways TAPS	How does the variety of invertebrates on the school field change over the year?	How has the use of insecticides affected bee population?	Why are people cutting down the rainforests and what effect does that have?

Year 4 - Electricity

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
• Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • 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. • Recognise that a switch opens and closes the circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors. • Know the difference between a conductor and an insulator; giving examples of each. • Safety when using electricity	• A source of electricity (mains of battery) is needed for electrical devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster. • Devices work harder when more electricity goes through them. • A complete circuit is needed for electricity to flow and devices to work. • Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.	Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.	
		Key Scientists	**Linked Texts**
		Thomas Edison (First Working Lightbulb) Joseph Swan (Incadesecant Light Bulb)	Until I Met Dudley (Roger McGough) Oscar and the Bird: A Book about Electricity (Geoff Waring) Electrical Wizard: How Nikola Tesla Lit Up the World (Elizabeth Rusch)

Prior Learning	Common misconceptions	Future Learning
In Early Years children: • May have some understanding that objects need electricity to work. • May understand that a switch will turn something on or off.	Some children may think: • Electricity flows to bulbs, not through them • Electricity flows out of both ends of a battery • Electricity works by simply coming out of one end of a battery into the component	In Year 6 children will: • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
How does the thickness of a conducting material affect how bright the lamp is? What objects complete the circuit? TAPS	How would you group these electrical devices based on where the electricity comes from?	How long does a battery light a torch for?	Which room has the most electrical sockets in a house?	How has electricity changed the way we live? How does a light bulb work?

Year 4 - ENERGY (Sound)

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
• Know how sound is made associating some of them with vibrating. • Know what happens to a sound as it travels from its source to our ears. • Know the correlation between the volume of a sound and the strength of the vibrations that produced it. • Know how sound travels from a source to our ears. • Know the correlation between pitch and the object producing a sound.	• Sound travels from its source in all directions and we hear it when it travels to our ears. • Sound travel can be blocked. • Sound spreads out as it travels. • Changing the shape, size and material of an object will change the sound it produces. • Sound is produced when an object vibrates. • Sound moves through all materials by making them vibrate. • Changing the way an object vibrates changes it's sound. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds	Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.	
		Key Scientists	**Linked Texts**
		Aristotle (Sound Waves) **Gailileo Galilei** (Frequency and Pitch of Sound Waves) **Alexander Graham Bell** (Invented the Telephone)	***Horrid Henry Rocks*** *(Francesca Simon)* ***Moonbird*** *(Joyce Dunbar)* ***The Pied Piper of Hamelin*** *(Natalia Vasquez)*

Prior Learning	Common misconceptions	Future Learning
In KS1 children: • May have some understanding that objects make different sounds. • Some understanding that they use their ears to hear sounds. • Know about their different senses.	Pitch and volume are frequently confused, as both can be described as high or low. Some children may think: • Sound is only heard by the listener • Sound only travels in one direction from the source • Sound can't travel through solids and liquids • High sounds are load and low sounds are quiet.	In KS3 children will learn about: • frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound • sound needs a medium to travel, the speed of sound in air, in water, in solids • sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • auditory range of humans and animals.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
How does the volume of a drum change as you move further away from it? How does … affect the pitch of the sound? TAPS Are two ears better than one? String telephone, what can you change to make it better? TAPS	Which material is best to use for muffling sound in ear defenders?	When is our classroom the quietest?	Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?	Do all animals have the same hearing range?

Year 4 - Materials – Solids, liquids and gases

National Curriculum Objectives

- Compare and group materials together, according to whether they are solids, liquids or gases.
- Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Sticky Knowledge

- Solids, liquids and gases are described by observable properties.
- Materials can be divided into solids, liquids and gases.
- Heating causes solids to melt into liquids and liquids evaporate into gases. d) Cooling causes gases to condense into liquids and liquids to freeze into solids.
- The temperature at which given substances change state are always the same.

Vocabulary

Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection,

Key Scientists	Linked Texts
Anders Celcius (Celcius Temperature Scale) **Daniel Fahrenheit** (Fahrenheit Temperature Scale / Invention of the Thermometer)	***Once Upon a Raindrop: The Story of Water*** *(James Carter)* ***Sticks*** *(Diane Alber)*

Prior Learning

In KS1 children should:

- Distinguish between an object and the material from which it is made.
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
- Describe the simple physical properties of a variety of everyday materials.
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Common misconceptions

Some children may think:

- 'Solid' is another word for hard or opaque
- Solids are hard and cannot break or change shape easily and are often in one piece
- Substances made of very small particles like sugar or sand cannot be solids P
- articles in liquids are further apart than in solids and they take up more space
- When air is pumped into balloons, they become lighter
- Water in different forms – steam, water, ice – are all different substances
- All liquids boil at the same temperature as water (100 degrees)
- Melting, as a change of state, is the same as dissolving
- Steam is visible water vapour (only the condensing water droplets can be seen)
- Clouds are made of water vapour or steam
- The substance on windows etc. is condensation rather than water
- The changing states of water (illustrated by the water cycle) are irreversible
- Evaporating or boiling water makes it vanish
- Evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material. Apply knowledge in familiar related contexts, including a range

Future Learning

In Year 5 children will:

- 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.
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.
- Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
- Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
- Explain that some changes result in the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research
How does the mass of a block of ice affect how long it takes to melt? Compare ways to measure temperature TAPS **Plan an investigations with real life context TAPS**	Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?	Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill?	Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?	What are hurricanes, and why do they happen?