Y4 Science – Animals, including Humans
Key Concept – Systems, Structures and Functions

Essential Knowledge

How is energy transferred up the food chain?
Energy is transferred up the food chain when animals eat plants or other animals, with each level getting less energy as you go higher.

Why do humans have different types of teeth?
Humans have different types of teeth, like sharp ones for cutting and flat ones for grinding, to help chew different kinds of food.

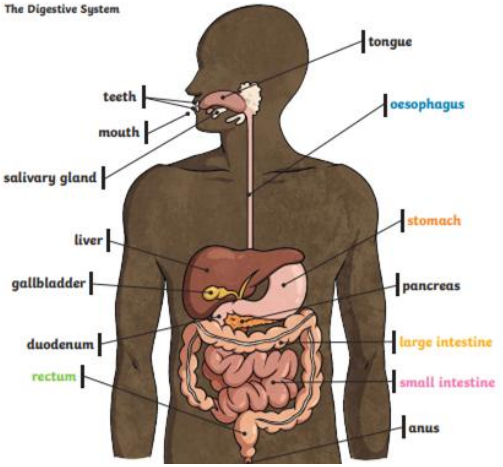
What happens in our bodies to the food we eat?
When we eat food, our digestive system breaks it down into smaller parts to give us energy and help us grow.

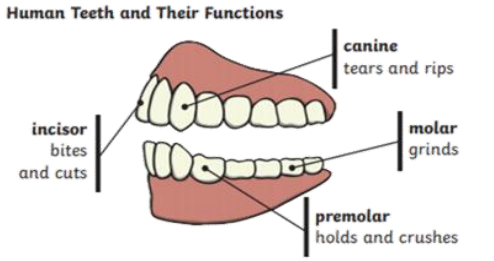
Aspirational Knowledge

All energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers.

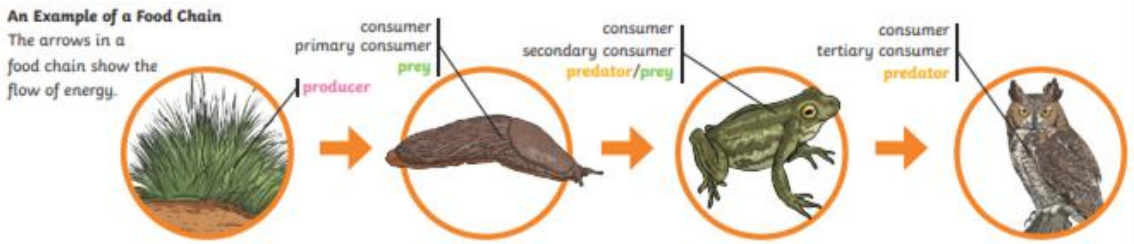
Working Scientifically

Making systematic and careful observations





Some people have wisdom teeth but they have no function now.



Key Vocabulary

food chain	A diagram that shows how energy is transferred from one living thing to another.
carnivore	An animal that only eats other animals.
herbivore	An animal that only eats plants.
omnivore	An animal that eats plants and other animals.
consumer	An animal in the food chain that gets its energy by eating plants or other animals.
predator	An animal that eats another animal.
prey	An animal that is eaten by another animal.
producer	A plant that produces food using energy from the Sun.
premolar	Tooth that holds and crushes
digest	Break down food so it can be used by the body.
oesophagus	A muscular tube which moves food from the mouth to the stomach
stomach	An organ in the digestive system where food is broken down with stomach acid and by being churned around.
small intestine	Part of the intestine where nutrients are absorbed into the body.
large intestine	Part of the intestine where water is absorbed from remaining waste food. Stools are formed in the large intestine.

Y4 Science – Animals, including Humans
Key Concept –Systems, Structures and Functions

Key Questions

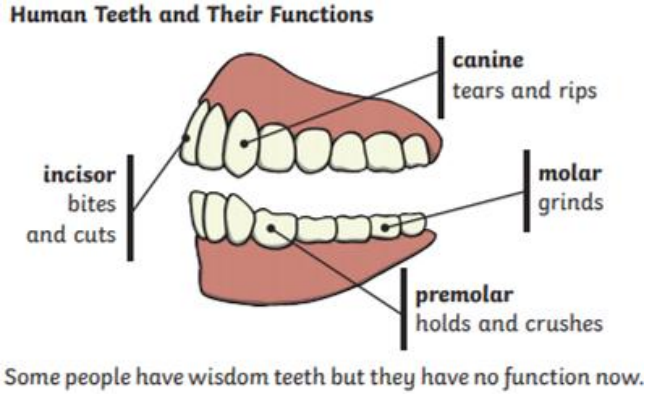
What is a food chain?
It shows us how energy is moved from one thing to another.

What teeth do humans have and what do they do?
Incisors slice food, canines tear food and molars grind food.

What happens in our bodies to the food we eat?
When we eat food, our bodies break it down into smaller parts to give us energy and help us grow.

Working Scientifically

Making observations



Key Vocabulary

	**food chain**	Shows how energy is moved from one living thing to another.
	**carnivore**	Only eats other animals.
	**herbivore**	Only eats plants.
 	**omnivore**	Eats plants and other animals.
	**consumer**	An animal that gets its energy by eating plants or other animals.
	**predator**	An animal that eats another animal.
	**prey**	An animal that is eaten by another animal.

Y4 Science – Electricity
Key Concept – Systems

Essential Knowledge

What common appliances run on electricity?
Common appliances that run on electricity are things like fridges, TVs, lights, computers, and microwaves. They all need electricity to work.

How do you construct an electrical circuit?
You can construct a simple electrical circuit by connecting a battery, wires, and a bulb so the electricity can flow and make the bulb light up.

How does a switch work?
A switch works by opening or closing the circuit, which either stops or allows the electricity to flow.

Which materials conduct electricity?
Materials like metals (such as copper, iron, and aluminium) conduct electricity because they let it flow through easily.

Why are insulators important in a circuit?
Insulators are important because they stop electricity from escaping and keep us safe from getting shocks.

Aspirational Knowledge

Electrical current can flow if there is a complete circuit. When electrical current flows through a circuit component within that circuit – such as buzzers which make a noise and bulbs which emit light – begin to work.

Key Vocabulary

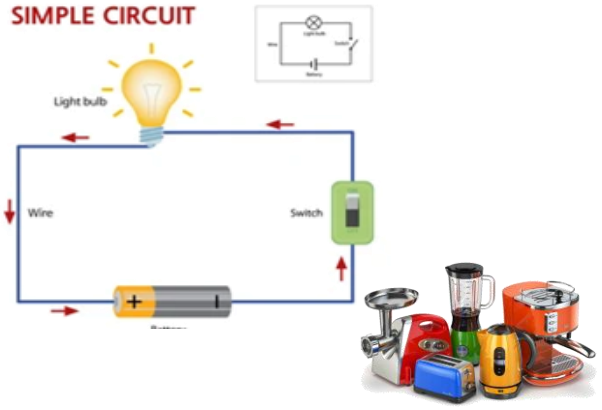
appliances	A device, machine, or piece of equipment, especially an electrical one that is used in the house, such as a cooker or washing machine.
electricity	Electricity is the flow of tiny particles called electrons and protons. It can also mean the energy you get when electrons flow from place to place.
cell	A container, usually a cylinder, which holds chemicals that generate an electric current when the cell is placed in a circuit and the circuit is switched on.
circuit	A loop made by wired and other components through which electricity can flow when the circuit is switched on.

Working Scientifically

Set up a simple practical enquiry.
Make systematic and careful observations.
Draw simple conclusions.

Key Vocabulary

current	Electric current is the movement of electrons through a wire.
mains	Mains electricity is when items are plugged into electrical wall sockets.
switch	A device for making, breaking, or changing the connections in an electrical circuit.
buzzer	An electric signalling device that makes a buzzing sound.
bulbs	A bulb is the glass part of an electric lamp, which gives out light when electricity passes through it.
battery	A group of cells connected.



Science – Electricity
Key Concept – Systems

Key Knowledge

What electrical items do we use?
Items that run on electricity are things like TVs, lights and computers. They all need electricity to work.

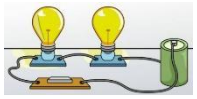
How do you construct a simple circuit?
You can construct a simple circuit by connecting a battery, wires, and a bulb.

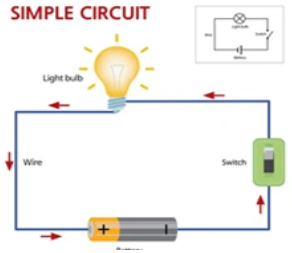
How does a switch work?
A switch works by opening or closing the circuit.

What materials conduct electricity?
Materials like metals, such as copper, iron, and aluminium, conduct electricity.

Why are insulators important in a circuit?
Insulators are important because they stop electricity from escaping and keep us safe from getting shocks.

Key Vocabulary

	**appliance**	An electrical machine that is used in the house, such as a cooker or washing machine.
	**battery**	A group of cells connected.
	**circuit**	A loop made by wires and other components through which electricity can flow when the circuit is switched on.
	**wire**	A long thin piece of metal that carries an electrical current often covered in plastic for safety.
	**electricity**	Electricity is the flow of tiny particles called electrons and protons. It can also mean the energy you get when electrons flow from place to place.



Working Scientifically

Set up a simple practical enquiry.
Make observations.
Find answers.

Y4 Science – Living Things
Key Concept – Change and Variation

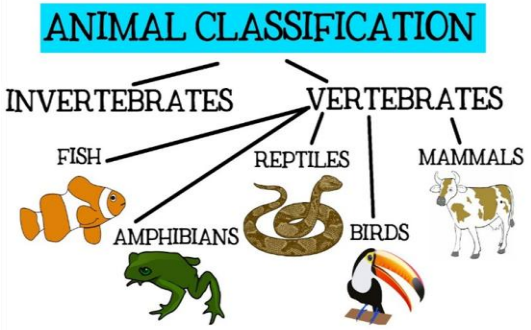
Essential Knowledge

What is a classification key?
A classification key can be used to identify living things. Animals can be grouped based on their physical characteristics and based on their behaviour.

How do you identify vertebrates and invertebrates?
You can identify vertebrates because they have a backbone, while invertebrates do not have a backbone.

What is living in your local habitat?
In our local area, we have birds like robins and pigeons, mammals like squirrels and hedgehogs, insects like bees and butterflies, and plants like nettles, daisies, and oak trees.

How have changes in the environment impacted upon habitats?
Changes in the environment, like cutting down trees or pollution, can harm habitats by taking away animals' homes and food.



Aspirational Knowledge

Create a classification key to sort plants on the school premises.

Changes to the environment can make it more difficult for animals to survive and reproduce; in extreme cases this leads to extinction.

Working Scientifically

Gather, record, classify and present data in a variety of ways to help in answering questions.
Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
Identify differences, similarities or changes related to simple scientific ideas and processes.

Key Vocabulary

vertebrates	Animals that have a backbone. These include mammals, birds, fish, reptiles and amphibians.
invertebrates	Animals that do NOT have a backbone. These include arachnids (spiders), molluscs (snails) and insects.
organism	A living thing made up of one or more cells and able to carry on the activities of life
characteristics	A special quality or appearance that makes an individual or a group different from others
variation	Any difference between the individuals in a species or groups of organisms of any species
classification	To classify things means to place them in different categories, or groups.
endangered	At risk of becoming extinct (dying out) on earth.
extinct	No longer existing.

Y4 Science – Living Things
Key Concept – Change and Variation

Key Knowledge

How are living things grouped?
Animals can be grouped based on their physical looks and based on their behaviour.

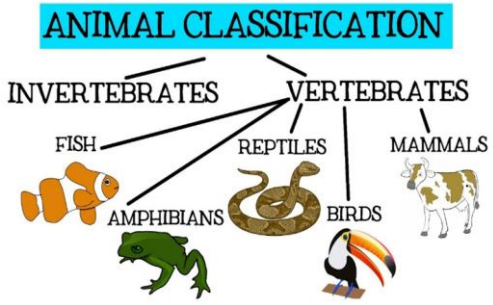
What are vertebrates and invertebrates?
Vertebrates have a backbone.
Invertebrates do not have a backbone.

What is living in your local habitat?
We have birds like robins and pigeons, mammals like squirrels and hedgehogs. We have insects like bees and butterflies.

How have humans changed habitats?
Animals have taken away animals' homes and food by cutting down trees and polluting nature.

Key Vocabulary

	**vertebrates**	Animals that have a backbone. These include mammals, birds, fish, reptiles and amphibians.
	**invertebrates**	Animals that do NOT have a backbone. These include spiders, snails and insects.
	**flowering plants**	These are plants that produce flowers.
	**non – flowering plants**	These are plants that do not produce flowers to reproduce. Ferns and mosses are examples of these.



Working Scientifically

Making careful observations.
Identify similarities and differences.
Record findings using scientific language.

Y4 Science – Sound
Key Concept – Cause and Effect

Essential Knowledge

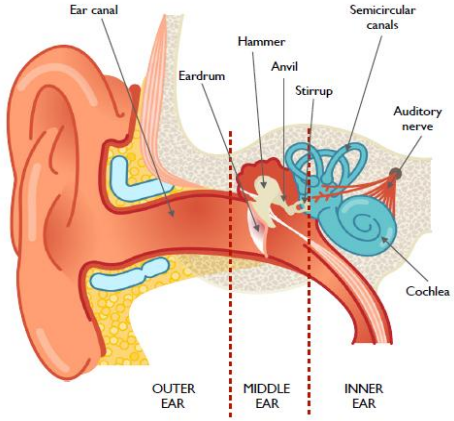
How do we hear?
Inside your ear, the vibrations hit the eardrum and are then passed to the middle and then the inner ear.

How are sounds made?
Sound is a type of energy. Sounds are created by vibrations. The louder the sound, the bigger the vibration.

Why does sound change in volume?
Sound changes in volume because the vibrations that make the sound can be stronger or weaker. When the vibrations are stronger, the sound is louder, and when they are weaker, the sound is quieter.

What happens to sounds when they travel a distance?
When sounds travel a distance, they get quieter because the sound energy spreads out. The further the sound travels, the harder it is to hear.

What changes the pitch of a sound?
The pitch of a sound changes when the vibrations are faster or slower. Faster vibrations make a high pitch, and slower vibrations make a low pitch.



Aspirational Knowledge

Inside your ear, the vibrations are then changed into electrical signals and sent to your brain. Your brain tells you that you are hearing a sound.

Sound travels at different speeds through different objects; it travels at around 340 metres per second in air.

Working Scientifically

Making systematic and careful observations

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

Key Vocabulary

vibrations	Aback-and-forth movement, invisible waves that move quickly.
volume	How loud or quiet a sound is.
pitch	How high or low a sound is.
sound waves	Invisible waves that travel through air, water and solid objects as vibrations, carrying the sound to our ears.
frequency	A measure of how many times per second the sound wave cycles.
travel	How something moves around.
transmit	To pass from one place or person to another.
amplitude	A measure of the strength of a sound wave.
decibel	A measure of how loud a sound is.
medium	Something that makes possible the transfer of energy from one location to another.
pinna	Outer ear shaped like a funnel to collect the sound waves.
ear canal	Tube that runs from the outer ear to the inner ear, lined with cells that produce ear wax.
eardrum	Thin layer of tightly stretched skin which vibrates when sound waves hit it.
cochlea	Spiral tube with fluid. Hearing receptors turn the movement into signals.
auditory nerve	Carries messages from the cochlea to the brain.

Y4 Science – Sound
Key Concept – Cause and Effect

Key Questions

How do we hear?
Inside your ear, the vibrations hit the eardrum

How are sounds made?
Sounds are created by vibrations.

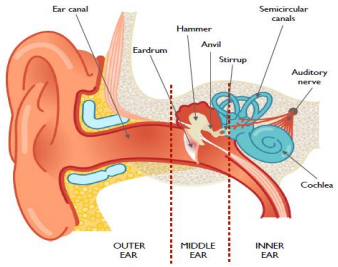
Why does sound change in volume?
Sound changes in volume because the noise can be louder or softer depending on how strong the vibrations are.

What happens to sounds when they travel a distance?
When sounds travel a distance, they get quieter because the sound energy spreads out.

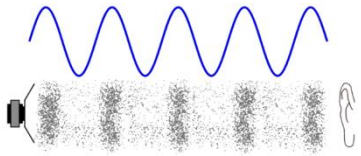
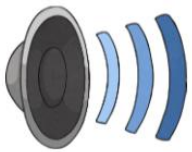
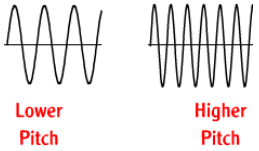
What changes the pitch of a sound?
The pitch of a sound changes when the vibrations are faster or slower.

Working Scientifically

Making careful observations.
Record findings using scientific language.



Key Vocabulary

	**vibration**	a back-and-forth movement, invisible waves that move quickly
	**volume**	how loud or quiet a sound is
	**pitch**	how high or low a sound is
	**sound waves**	invisible waves that travel through air, water, and solid objects as vibrations, carrying the sound to our ears
	**decibel**	a measure of how loud a sound is

Y4 Science – States of Matter
Key Concept – Change

Essential Knowledge

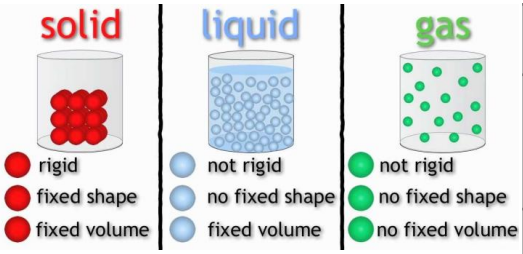
What is a state of matter?
A state of matter tells us whether something is a solid, a liquid, or a gas, depending on how its particles are arranged and move.

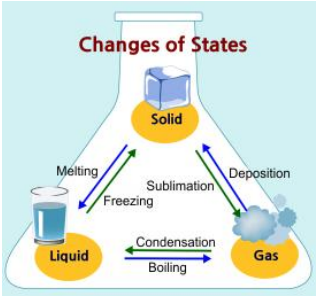
How can we measure the temperature of when a material cools or melts?
We can measure the temperature when a material cools or melts using a thermometer.

How do materials change when they are heated?
When materials are heated, their particles move faster and spread apart, which can make them expand or change state.

How do materials change when they are cooled?
When materials are cooled, their particles move slower and come closer together, which can make them contract or change state.

What part do evaporation and condensation play in the water cycle?
In the water cycle, evaporation turns water into gas, and condensation turns it back into liquid to form clouds.





Aspirational Knowledge

Water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater. There are bonds between the particles in a solid.

Working Scientifically

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Key Vocabulary

temperature	How hot or cold something is, normally measured in degrees Celsius
Celsius	The common scale in the UK for measuring temperature.
particle	A tiny amount of something/extremely small unit of matter.
matter	Any solid, liquid or gas that exists in the universe.
melting	The process of a solid **heating** and changing into a liquid.
evaporation	The process of a liquid **heating** and changing into a gas.
condensation	The process of a gas **cooling** and changing into a liquid.
freezing	The process of a liquid **cooling** and changing into a solid.
precipitation	When water or snow fall from a cloud.
boiling	To become so hot (100®C) that water bubbles and then turns into a gas.

Y4 Science – States of Matter
Key Concept – Change

Key Knowledge

What is a state of matter?
A state of matter tells us whether something is a solid, a liquid, or a gas

How can we measure the temperature of when a material cools or melts?
We use a thermometer to measure the temperature of a material.

How do materials change when they are heated?
When materials get hot, their tiny particles move faster and spread out, which can make them get bigger or turn into a different state.

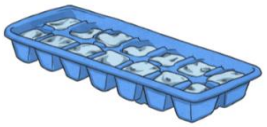
How do materials change when they are cooled?
When materials get cold, their tiny particles move slower and come closer together, which can make them get smaller or change into a different state.

What part do evaporation and condensation play in the water cycle?
In the water cycle, evaporation turns water into gas, and condensation turns it back into liquid to form clouds.

Working Scientifically

Report on findings from investigations.

Key Vocabulary

	**temperature**	How hot or cold something is, normally measured in degrees Celsius
	**evaporation**	The process of a liquid **heating** and changing into a gas.
	**freezing**	The process of a liquid **cooling** and changing into a solid.
	**boiling**	To become so hot (100®C) that water bubbles and then turns into a gas.
	**precipitation**	When water or snow fall from a cloud.