

VOCABULARY

Properties: a quality that something is known by (characteristic and features)

Solubility: the quality or extent of being soluble; ability to be dissolved

Transparency: how easily it is to look through a material to what is on the other side

Electrical conductivity: the capacity for or property of conducting or transmitting electrical currents

Thermal conductivity: the capacity for or property of conducting or transmitting heat

Magnetic: when a material attracts magnets

Dissolve: to mix completely with liquid

Solution: a mixture that contains two or more unlike substances combined evenly

Substance: that of which something is made

Solids: having a firm shape or form that can be measured in length, width, and height; not like a liquid or a gas

Liquids: a form of matter that flows easily and is neither a solid nor a gas. Liquid can take on the shape of any container it is poured into

Gases: a form of matter that is neither liquid nor solid.

Evaporation: to turn from liquid into gas

Condensation: the act or process of changing from a gas to a liquid



SCIENCE KNOWLEDGE MAT

Everyday Materials

MAIN IDEA

Compare and group materials together, according to whether they are solids, liquids or gases.

Observe that some materials change state when they are heated or cooled and link this to the water cycle.

Begin to think about reversible and irreversible changes in materials.

WHAT CAME BEFORE

Explore in more depth why materials are chosen for certain purposes. Experiment with changing the shapes of solids.

WHAT COMES NEXT

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.

KEY LEARNING

Pupils can compare and group materials together, according to whether they are solids, liquids or gases.

They can 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 ($^{\circ}\text{C}$).

Pupils can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

STATES OF MATTER



WHAT YOU SHOULD ALREADY KNOW

Pupils can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. They know that the shapes of solids can be changed, and can begin to describe the changes that water can go through.

INVESTIGATE / QUESTIONS

Investigate how a material can be changed depending on whether they are a solid, liquid or gas. For example, can chocolate change states? How? Is it a reversible or irreversible change?

What kind of states can water be in, and how can these changes occur? What do these changes relate to?

Which real life processes involve changing states of materials? For example, cooking, making glass by heating sand. Are these changes reversible? Can you un-bake a cake and separate the ingredients again?

VOCABULARY

Biomes: a natural area of vegetation and animals.

Carnivore: an animal that eats meat.

Deciduous: trees that lose leaves in the autumn every year.

Environment: all the circumstances, people, things, and events around them that influence their lives.

Evergreen: a tree or bush which has green leaves all the year round.

Excretion: the process of eliminating waste from the body.

Habitat: the natural environment in which an animal or plant normally lives or grows.

Herbivore: an animal that only eats plants.

Invertebrate: a creature that does not have a spine, for example an insect, a worm, or an octopus.

Microhabitat: a small part of the environment that supports a habitat, such as a fallen log in a forest.

Minibeast: a small invertebrate animal such as an insect or spider.

Nutrition: the process of taking food into the body and absorbing the nutrients in those foods.

Omnivore: person or animal eats all kinds of food, including both meat and plants.

Reproduction: when an animal or plant produces one or more individuals similar to itself.

Respiration: process of breathing.

Vegetation: plants, trees and flowers.

Vertebrate: a creature which has a spine.



SCIENCE KNOWLEDGE MAT

Living Things and Their Habitats

MAIN IDEA

Children should be able to group living things in a variety of ways. They should be able to use clarification keys to help group, identify and name a variety of living things in their local area. It is important to recognise that environments can change and this can sometimes make it dangerous.

WHAT CAME BEFORE

Year 3 – to identify that animals cannot make their own nutrition and therefore receive it from food.

WHAT COMES NEXT

Year 5 – to describe the differences in the life cycles of different animals and the process of reproduction.



WHAT YOU SHOULD ALREADY KNOW

- Animals can be grouped into vertebrates and invertebrates.
- Animals can be grouped into carnivores, herbivores and omnivores.
- The differences between the teeth of carnivores and herbivores.
- The name of some common wild and garden plants, and deciduous and evergreen

KEY LEARNING

- All living things, also known as organisms, must do certain things in order to stay alive, these are known as life processes.
 - ⇒ Movement
 - ⇒ Respiration
 - ⇒ Sensitivity
 - ⇒ Growth
 - ⇒ Reproduction
 - ⇒ Excretion
 - ⇒ Nutrition
- Living things can be grouped according to different criteria: where they live, what type of organism they are, what features they have.
- A classification key is a tool that is used to group living things to help us identify them.
- Habitats can change throughout the

INVESTIGATE / QUESTIONS

- Can you sort vertebrate and invertebrate animals into groups? Challenge: create a classification key.
- Observe minibeasts in a microhabitat.
- Can you explore the impact humans are having on different environments? Consider both negative and positive effects.

VOCABULARY

Canine: pointed teeth near the front of the mouth of humans and of some animals.

Decay: gradually destroyed by a natural process.

Digestion: breaking down ingested food material.

Enamel: the hard white substance that forms the outer part of a tooth.

Excretion: the process of eliminates faeces, urine, or sweat from the body.

Incisor: the teeth at the front of your mouth which you use for biting into food.

Ingested: when animals or plants ingest a substance, they take it into themselves, for example by eating or absorbing it.

Intestines: the tubes in your body through which food passes when it has left your stomach.

Molar: the large, flat teeth towards the back of your mouth that you use for chewing food.

Muscles: something inside your body which connects two bones and which you use when you make a movement.

Oesophagus: the part of your body that carries the food from the throat to the stomach.

Plaque: a substance continuing bacteria that forms on the surface of your teeth.

Predator: an animal that hunts and eats other animals.

Producer: a plant that produces its own food.

Prey: an animal that gets hunted .

Saliva: the watery liquid that forms in your mouth and helps you to chew and digest food.



SCIENCE KNOWLEDGE MAT

Animals Including Humans

MAIN IDEA

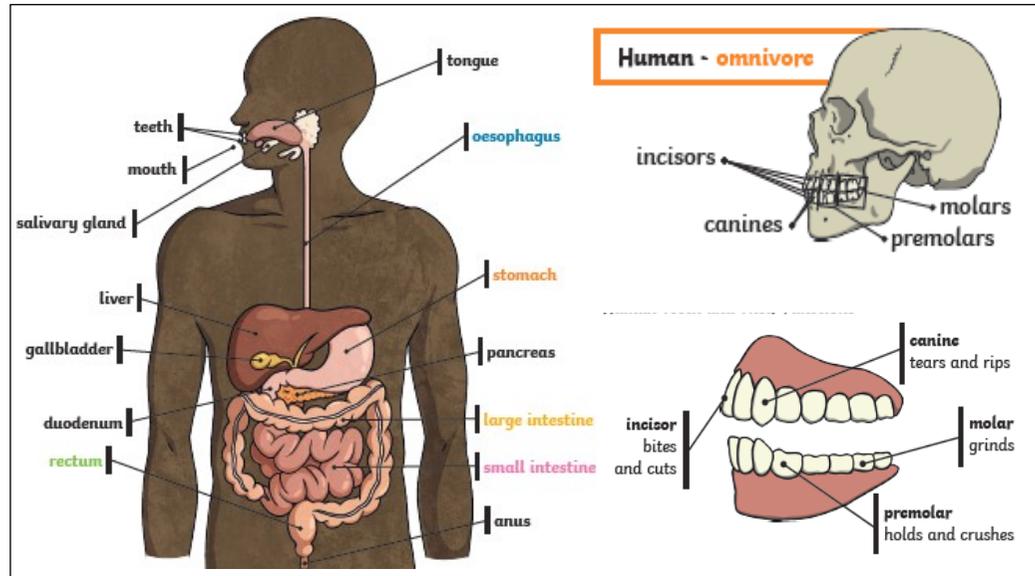
Children should be able to describe the functions of the basic parts of the digestive system in humans. Similarly, they will be able to identify different human teeth and explain their functions. Finally, they will construct a variety of food chains in order to identify predators and prey.

WHAT CAME BEFORE

Year 3 – understand that humans get nutrition from what they eat. Animals have skeletons for support.

WHAT COMES NEXT

Year 5 – recognise the changes as humans develop to old age.



KEY LEARNING

- Humans look after their teeth by brushing and flossing. They ensure that they do not regularly eat foods high in sugar. Not looking after teeth can lead to an increase in plaque and tooth decay.
- Canines are pointed for tearing and ripping food—these are usually used when chewing meat.
- Incisors are shovel shaped and help bite lumps out of and cutting food.
- Premolars and molars are flat and they grind and crush food.
- The smell of food triggers saliva to be produced. Saliva is mixed with the food which helps to break it up.
- When the food is small enough to be swallowed, it is pushed down the oesophagus by muscles to the stomach. In the stomach, food is mixed. The mixed

WHAT YOU SHOULD ALREADY KNOW

- The parts of the human body and what they do.
- All animals need water, air and food to survive.
- Animals, including humans, get nutrition from what they eat.

INVESTIGATE / QUESTIONS

- Do sugary drinks increase the amount of plaque found on your teeth?
- Do herbivores and carnivores have the same teeth? Why?
- Can you identify the parts of the digestive system and explain their functions?

VOCABULARY

Circuit: An electrical circuit is a path or line through which an electrical current flows

Buzzer: an automatic signalling device. They are used as alarms and door bells.

Conductor: an object or type of material that allows the flow of an electrical current in one or more directions

Battery: a device that stores chemical energy and makes it available in an electrical form

Cells: electrical cell is a device that is used to generate electricity

Switch: an electrical component that can "make" or "break" an electrical circuit

Socket: Sockets allow electric equipment to be connected to the alternating current (AC) power supply in buildings and at other sites

Appliance: an electrical appliance is a device that uses electricity to perform a function

Appliance series circuit: Components connected in series are connected along a single path, so the same current flows through all of the components.

Insulator (electrical): an insulator is a material whose internal electric charges do not flow freely.



SCIENCE KNOWLEDGE MAT

Y4 Electricity

MAIN IDEA

Pupils will identify common appliances that run on electricity and construct simple electrical circuits. They will be able to identify and name its basic parts, including cells, wires, bulbs, switches and buzzers. Draw simple electrical circuits.

WHAT CAME BEFORE

NA - new concept.

WHAT COMES NEXT

Y6 - draw the circuit as a pictorial representation using conventional circuit symbols. 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.



WHAT YOU SHOULD ALREADY KNOW

Electricity is needed to power devices found in the home.

Electricity can be dangerous.

Batteries are portable electricity.

KEY LEARNING

- Explore and build simple circuits, and identify how they do and do not work.
- 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 a 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.

INVESTIGATE / QUESTIONS

Look at your electrical devices at home - which ones run on mains power / batteries / charged power?

What other forms of energy are there beyond batteries and mains electricity? How are they useful to the future of the world?

How can electricity be dangerous? How can we protect ourselves?

Take apart an old or faulty electrical device **with the help of an adult**. What do the parts tell you about materials and which ones are electrical conductors and insulators?

VOCABULARY

Sound: a type of energy made by vibrations, that can be heard

Eardrum: a part of your ear that vibrates so that you can hear sound

Vibrations: the shaking back and forth of something. In the case of sound, it is the air that vibrates

Soundwaves: sound travels through the air as vibrations called soundwaves

Volume: how loud or quiet a sound is

Pitch: how high or low a sound is

Insulation: something that stops sound, or lessens it

Amplitude: the size of a vibration. E.g. The larger the amplitude, the louder the sound

Loud: when the volume of a sound is high

Faint: when the volume of a sound is low



SCIENCE KNOWLEDGE MAT

Y4 Sound

MAIN IDEA

Pupils will learn about how sound is made, and how it is heard. Sound is an energy, and it is created by vibrations. It travels through the air as soundwaves, and the bigger the vibration, the louder the sound. There is no sound in space!



WHAT CAME BEFORE

Exploration of sound and music through recorder and music sessions.



WHAT YOU SHOULD ALREADY KNOW

Sound can be described as loud or quiet, and this is called volume.

Pitch of a sound refers to whether it is higher, or lower.

Loud sounds can damage our eardrums, the part of our body that enables us to hear.

Some people are deaf and cannot hear at all, or not fully, and can communicate through sign language instead.

KEY LEARNING

- Know how sound travels from the source to the ears.
- Know to associate sound with vibration.
- know the correlation between pitch and the object producing a sound.
- know the correlation between the volume of a sound and the strength of the vibrations that produced it.
- know what happens to a sound as it travels away from its source.

INVESTIGATE / QUESTIONS

Can you make a musical instrument using items found around the home? How can you make the volume and pitch of the sounds you make with it change?

It is said that soundwaves travel similarly to ripples in water when a pebble is thrown in it. Do this, and observe how the ripples move and investigate how soundwaves may move too.

Can you make a telephone using strings and two cups?