



Year 4

Year 4 • Animals Including Humans

Unit overview

KEY KNOWLEDGE

Know the basic functions of parts of the digestive system in humans. Digestion breaks down food into smaller and smaller bits to eventually get through the gut into the blood. Identify different types of teeth and describe their functions. Construct and interpret food chains. Identify producers (of energy), consumers (of energy), predators & prey.

KEY VOCABULARY

Nutrition, nutrients, digestion (physical / chemical), enzymes, acid, mouth, teeth, incisor, canine, pre-molar, molar, enamel, bacteria, plaque, decay, hygiene, gullet (oesophagus), stomach, small intestine, large intestine, anus, liver, gall bladder, pancreas, absorb (absorption), faeces, diet, carbohydrate, protein, fat, energy, calories, food chain, producer, consumer, predator, prey, transfer, carnivore, herbivore, omnivore, pattern, trend, relationship, conclusion, valid (validity).

PRIOR LEARNING

Identify carnivores, herbivores & omnivores (Animals; year1) Know the 7 processes of life – nutrition (Living Things; year2) Plants need light to grow (Plants; year 2) Describe simple food chains (Living Things; year 2) Identify & name different sources of food (Living Things; year2) Importance of right types of food & energy (Animals; year2/3) Light/food is energy that can be transferred (Light; year3)

DISCIPLINARY KNOWLEDGE & SKILLS

We need food nutrients to grow, keep warm, protect & Digestion breaks food down into tiny pieces (into • Identify / label parts of the digestion system (gut). Describe simple functions of teeth (mouth, tongue), • Identify / label incisors, canines, pre-molars & molars. Describe simple functions of each (relate to Big Picture) • Identify / label gum, enamel / root on a tooth. Cleaning teeth removes bacteria from teeth. Prevents • Describe predator and prey. Identify examples. Plants need light (energy) to grow. Source is the sun. • Construct a range of food chains using research or Identify prey/predators, producers/consumers

ENQUIRY TYPES

Researching; Classification; Finding Patterns; Observing over time; Fair testing

SCIENTISTS / STEM LINKS

No named scientist is specified in the supplied SLS unit document.

WHY THIS? WHY NOW?

Builds on Year 3 nutrition, skeletons and muscles and earlier food-chain learning. Pupils now study digestion, teeth and food chains in greater depth. This provides essential body-system knowledge before Year 6 circulation, blood and lifestyle.

CAREERS LINK

Dentist • Gastroenterologist • Dietitian • Veterinary scientist
Gatsby: BM4 – connect digestion/teeth to health careers; BM5 – encounter a dental/medical professional; BM6 – explore healthcare settings.

Year 4 • Animals Including Humans

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
What happens to our food when we eat?	We need food nutrients to grow, keep warm, protect & Digestion breaks food down into tiny pieces (into	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	Researching; Classification; Finding Patterns; Observing over time; Fair testing
How does the digestive system work?	Identify / label parts of the digestion system (gut). Describe simple functions of teeth (mouth, tongue),	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
What job do our teeth do in digestion?	Identify / label incisors, canines, pre-molars & molars. Describe simple functions of each (relate to Big Picture)	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How should we care for our teeth?	Identify / label gum, enamel / root on a tooth. Cleaning teeth removes bacteria from teeth. Prevents	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
What is a food chain?	Describe predator and prey. Identify examples. Plants need light (energy) to grow. Source is the sun.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Can you describe different food chains?	Construct a range of food chains using research or Identify prey/predators, producers/consumers and	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	

Year 4 • Electricity

Unit overview

KEY KNOWLEDGE

Recognise common appliances that run on electricity. Construct a range of simple closed series circuits. Draw these circuits with correct component symbols (named). Recognise and solve 'errors' in circuits to make them work. A switch opens and closes a circuit. Conductors allow electrical (energy) to pass through them. Insulators do not allow electrical (energy) to pass through.

KEY VOCABULARY

Electric (electricity), source, energy, transfer, flow, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, light, sound, conductor, insulator, metal, copper, iron, steel, non-metals, plastic, wood, glass, rubber, pattern, trend, relationship, conclusion, valid (validity).

PRIOR LEARNING

Group objects according to their material (Materials; yr1) Some materials are conductors & insulators (Materials; yr2) Appliances need electricity (source) to work (Circuits; yr2) Artificial light sources need energy from battery (light; yrs 1/3) Can name components with symbols in a circuit (Circuits; yr2) Can build simple series circuits from instructions (Circuits; yr2) Can identify electric dangers & keep safe (Circuits; yr2)

DISCIPLINARY KNOWLEDGE & SKILLS

Electricity = Electrical energy (Energy Transfer Model) Know appliances need electricity ('energy' source) • Identifies the battery as the 'energy' source. Can identify & recognise/draw the symbols for wire, • Can use the Energy Transfer Model to describe the flow Can describe energy transfer 'out' from components (as • Knows importance of closed circuit (open not 'blocked'; A switch can control energy flow by opening • Conductors allow electrical energy to pass through Insulators do not allow electrical energy to pass • Can construct circuits that have a range of components, Use Energy Transfer Model to describe/explain flow.

ENQUIRY TYPES

Researching; Classification; Finding Patterns; Fair testing; Problem Solving

SCIENTISTS / STEM LINKS

Alessandro Volta (1745–1827) Italian scientist who was a pioneer of electricity and invented the electric battery in 1799. His name is used to name the Volt as a unit of electrical energy transfer. Benjamin Franklin (1706–1790) One of the founding fathers of America and a scientist who used lightning rods (not a kite) to show electrical energy could be harnessed and used. James Clerk Maxwell (1831–1879) Scottish scientist who worked on wide-ranging developments in electricity & electronics, including radio.

WHY THIS? WHY NOW?

Builds on Year 2 simple circuits. Pupils now construct and troubleshoot series circuits, use switches and compare conductors and insulators. This prepares for Year 6, where pupils investigate how component behaviour changes with circuit variables.

CAREERS LINK

Electrical engineer • Electrician • Electronics technician • Renewable-energy engineer
Gatsby: BM4 — connect circuit design to electrical careers; BM5 — encounter an engineer/electrician; BM6 — explore electrical systems in a workplace.

Year 4 • Electricity

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
Which appliances need electricity?	Electricity = Electrical energy (Energy Transfer Model) Know appliances need electricity ('energy' source)	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	Researching; Classification; Finding Patterns; Fair testing; Problem Solving
Can you build a working circuit safely?	Identifies the battery as the 'energy' source. Can Can identify & recognise/draw the symbols for wire,	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Can you describe (& explain) how	Can use the Energy Transfer Model to describe the flow Can describe energy transfer 'out' from components (as	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How does a switch work?	Knows importance of closed circuit (open not 'blocked'; A switch can control energy flow by opening	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
What are electrical conductors &	Conductors allow electrical energy to pass through Insulators do not allow electrical energy to pass	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Can you build circuits and describe/	Can construct circuits that have a range of components, Use Energy Transfer Model to describe/explain flow.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	

Year 4 • Living Things and their Habitats

Unit overview

KEY KNOWLEDGE

Living things can be grouped in a variety of ways. Use classification keys to group, identify and name living things in local habitats. Know how to randomly sample a habitat for species diversity (biodiversity). Measure species richness & abundance. Environments can change and this can pose dangers to living things. Conservation acts to save species and restore habitats. Learn how to change a habitat to encourage biodiversity.

KEY VOCABULARY

Habitat, environment, micro-habitat, abiotic, plants (habitat specific examples), animals (habitat specific examples), vertebrates, invertebrates, predator, prey, adapted (adaptation), competition, pollution, toxic, conservation, species, diversity, richness, abundance, biodiversity, sample (sampling), pit-fall trap, sweep net, pooter, key, spider key, number key, classify (classification), feature, table of results, cause, effect, repeats (repetition), bar chart, bar, graph, axes, data point, coordinate....

PRIOR LEARNING

Identify local plants & animals by sight (Plants; Animals Yr1) Define/identify carnivore, herbivore & omnivore (Animals Yr1) Requirements for plant/animal growth (Plants; Animals Yr2/3) Life cycle of plant (flowering) & animal (Plants; Animals Yr2/3) Skeleton (& exoskeleton) (Animals Yr3) Describe habitats & micro-habitats (Living things Yr2) Construct food chains (transfer food/energy) (Living things Yr2)

DISCIPLINARY KNOWLEDGE & SKILLS

Create criteria for sorting animals & plants based upon Use spider keys to identify a range of plants & animals • Can classify plants into flowering & non-flowering Can classify animals into vertebrates (fish, amphibians, • Can use random sampling to identify plants & animals Proficient at using quadrats (hoops), pit-fall traps, • Can organise/present historical and collected primary Recognise that different habitats support different • Know negative impacts of pollution, habitat Know how world, UK and local biodiversity has dropped • Can use data and secondary sources to plan for positive Can organise & present collected primary data to show

ENQUIRY TYPES

Researching; Classification; Finding Patterns; Observing over time; Fair testing; Problem Solving

SCIENTISTS / STEM LINKS

Carl Linnaeus (1707-1778) Swedish scientist was the first to describe classification by observable characteristics and used Keys to provide a guide to accurate identification. Thomas Lovejoy (1941-2021) American scientist described as the 'Godfather of biodiversity'. Conservationist and policy advisor at a global level. First to describe the effect of tropical deforestation. Rachel Carson (1907-1964) American scientist, conservationist and started the global environmental movement. She worked on marine ecosystems...

WHY THIS? WHY NOW?

Retrieves KS1 habitats and Year 3 plant/animal classification. Pupils now use classification keys, consider biodiversity and investigate how environmental change affects living things. This prepares for Year 6 classification and evolution/adaptation.

CAREERS LINK

Ecologist • Conservation scientist • Environmental consultant • Ranger
Gatsby: BM4 – connect biodiversity to environmental careers; BM5 – encounter an ecologist; BM6 – undertake fieldwork or explore a conservation workplace.

Year 4 • Living Things and their Habitats

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
Can we group & identify living things in	Create criteria for sorting animals & plants based upon Use spider keys to identify a range of plants & animals	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	Researching; Classification; Finding Patterns; Observing over time; Fair testing; Problem Solving
How are animals & plants grouped?	Can classify plants into flowering & non-flowering Can classify animals into vertebrates (fish, amphibians,	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
What is the biodiversity in a habitat?	Can use random sampling to identify plants & animals Proficient at using quadrats (hoops), fit-fall traps,	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How does biodiversity change within a	Can organise/present historical and collected primary Recognise that different habitats support different	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How can habitats change?	Know negative impacts of pollution, habitat Know how world, UK and local biodiversity has dropped	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Can we improve biodiversity in a habitat?	Can use data and secondary sources to plan for positive Can organise & present collected primary data to show	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	

Year 4 • Sound

Unit overview

KEY KNOWLEDGE

Identify how sounds are made (sound energy, vibrations) Sound energy/vibrations travel from a source, through a medium (solid, liquid or gas), to your ear. The volume of a sound is linked to the strength of vibrations (sound energy) that produces it. Distance away from the source affects the volume of sound. The pitch of a sound is linked to the frequency of vibrations (sound energy) that produces it.

KEY VOCABULARY

Sound, energy, transfer, source, ear, particles, solid, liquid, gas, vibration, volume, decibels, frequency, pitch, Hertz, reflected, transmitted, absorbed, fainter / louder, lower / higher, variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.

PRIOR LEARNING

Label body parts (ears). Link to senses (Animals; yr1) Know living features (sensitivity) (Living Things; yr2) Differences between solid, liquid & gas (Materials; yr2) Energy can be transferred (light; yr3. Electricity; yr4) Matter is made from particles (Rocks; yr3) Particles move faster with more energy (States of Matter; yr4) Energy can transfer between particles (States of matter; yr4)

DISCIPLINARY KNOWLEDGE & SKILLS

We see, feel and hear sounds as vibrations. The more energy we put in the bigger the vibrations. • Sound energy make particles move faster and collide Sound energy is transferred through colliding particles • The bigger the energy / vibrations reaching the ear, the Sound volume is measured in Decibels (dB). Measure. • • Sound energy is transferred through colliding particles Sound travels fastest through solids (particles are • The higher the frequency (speed) of vibrations (sound Pitch is measured in Hertz (Hz).

ENQUIRY TYPES

Researching; Finding Patterns; Fair testing

SCIENTISTS / STEM LINKS

Robert Boyle (1627-1691) Discovered that sound needs to travel through matter (later particles). Sound does not travel in a vacuum. Christian Doppler (1803-1853) Discovered that sound vibrations get 'less' the further way from the source they are (Doppler Effect). Alexander Graham Bell (1847-1922) Invented the telephone in 1876. His mother & his wife were both deaf. He supported hearing education all his life. Sound Year 4

WHY THIS? WHY NOW?

Builds on pupils' everyday experiences of hearing and vibration. Pupils now connect sound to vibrations, pitch, volume and distance and investigate patterns systematically. This develops modelling and fair-testing skills that transfer to upper-KS2 physics.

CAREERS LINK

Acoustic engineer • Sound engineer • Audiologist • Music technologist
Gatsby: BM4 — connect sound science to audio careers; BM5 — encounter an audiologist/engineer; BM6 — explore a studio, theatre or performance workplace.

Year 4 • Sound

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
What is sound?	We see, feel and hear sounds as vibrations. The more energy we put in the bigger the vibrations.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	Researching; Finding Patterns; Fair testing
How does sound travel (transfer)?	Sound energy make particles move faster and collide Sound energy is transferred through colliding particles	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How can we change the volume of	The bigger the energy / vibrations reaching the ear, the Sound volume is measured in Decibels (dB). Measure.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How can we change the volume of		Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Does sound travel (transfer) differently	Sound energy is transferred through colliding particles Sound travels fastest through solids (particles are	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How can we change the pitch of a sound?	The higher the frequency (speed) of vibrations (sound Pitch is measured in Hertz (Hz).	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	

Year 4 • States of Matter

Unit overview

KEY KNOWLEDGE

Groups materials as solids, liquids or gases. Know the features (criteria) that make them different. Can describe, using the particle model, how substances change from a gas, into a liquid, then into a solid (and back again) as they are heated or cooled. Temperature (oC) affects the speed (rate) of evaporation. Describe the water cycle (evaporation and condensation).

KEY VOCABULARY

Material, substance, solid, liquid, gas, flow, compressed, volume, density, state, particle, energy, movement, collision, attraction, heat, temperature (oCelsius), ice, water, water vapour, melting, boiling, freezing, condensation, evaporation, speed (rate), melting point, boiling point, water cycle, run-off, rainfall (precipitation), variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.

PRIOR LEARNING

Simple properties of solid, liquid & gas (Materials Yr1 & 2) Clouds form rain which falls as water (Seasons Yr1) Warm air evaporates water; cold air freezes water (Seasons Yr1) Materials can be squashed (Materials Yr2) Rocks can be broken down (into particles) (Rocks Yr3) Particles move (vibrate; collisions) with energy (Sound Yr4) Particles move faster with more energy (Sound Yr4)

DISCIPLINARY KNOWLEDGE & SKILLS

Can describe properties of solids, liquids & gases: Observe water as ice, water & vapour. Describe • Particles have energy that make them move. More Particles are attracted to each other. • Know that particles in a substance/state may have Heat energy at a surface warms particles so they move • Can describe particles in liquid when warmed/cooled Can draw/annotates particles in liquid & solid. Relates • Describes condensation of water vapour into visible Droplets fall as rain (precipitation) when get too heavy. • Understand the role of evaporation & condensation. Can describe, using the particle model, the process of

ENQUIRY TYPES

Classification; Finding Patterns; Observing over time; Fair testing; Researching

SCIENTISTS / STEM LINKS

Democritus (460–370 BC) Ancient Greek scientist who taught that matter can be cut into smaller units. The smallest units he called atoms ('atomos' meaning uncuttable). John Dalton (1766–1844) English scientist that developed particle theory when breaking substances down by weight. He called this his Law of Multiple Proportions. Humphry Davy (1778–1829) English scientist who invented the Davy Lamp and discovered and isolated many chemical elements. He also created the first incandescent light using electricity.

WHY THIS? WHY NOW?

Builds on Year 2 introduction to solids, liquids and gases. Pupils now use a particle model to explain states, changes of state, evaporation, condensation and the water cycle. This prepares for Year 5 dissolving, separating mixtures and reversible/irreversible changes.

CAREERS LINK

Chemical engineer • Meteorologist • Water scientist • Laboratory technician
Gatsby: BM4 – connect states/changes to laboratory and water careers; BM5 – encounter a scientist/technician; BM6 – explore a lab, water-treatment or weather workplace.

Year 4 • States of Matter

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
How are solids, liquids & gases different?	Can describe properties of solids, liquids & gases: Observe water as ice, water & vapour. Describe	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	Classification; Finding Patterns; Observing over time; Fair testing; Researching
What happens when water changes	Particles have energy that make them move. More Particles are attracted to each other.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
Is evaporation the same as boiling?	Know that particles in a substance/state may have Heat energy at a surface warms particles so they move	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
What happens when water changes	Can describe particles in liquid when warmed/cooled Can draw/annotates particles in liquid & solid. Relates	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How do clouds form?	Describes condensation of water vapour into visible Droplets fall as rain (precipitation) when get too heavy.	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	
How does the water cycle work?	Understand the role of evaporation & condensation. Can describe, using the particle model, the process of	Use scientific vocabulary/models; predict, observe, measure, classify or record data as appropriate.	