Year: One
Term: Autumn 1

# Science Knowledge Organiser
# Everyday Materials

SUPER 6

| | |
|---|---|
| • I can distinguish between and object and the material it is made from | Red / Orange / Green |
| • I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock | Red / Orange / Green |
| • I can describe the physical properties of a variety of everyday materials | Red / Orange / Green |
| • I can compare and group everyday materials based on their physical properties | Red / Orange / Green |
| • I can talk about what I found out and how I found it out | Red / Orange / Green |
| • I can use the equipment provided for me to perform simple tests that have been planned as a whole class | Red / Orange / Green |

## I can use common words and phrases relating to science

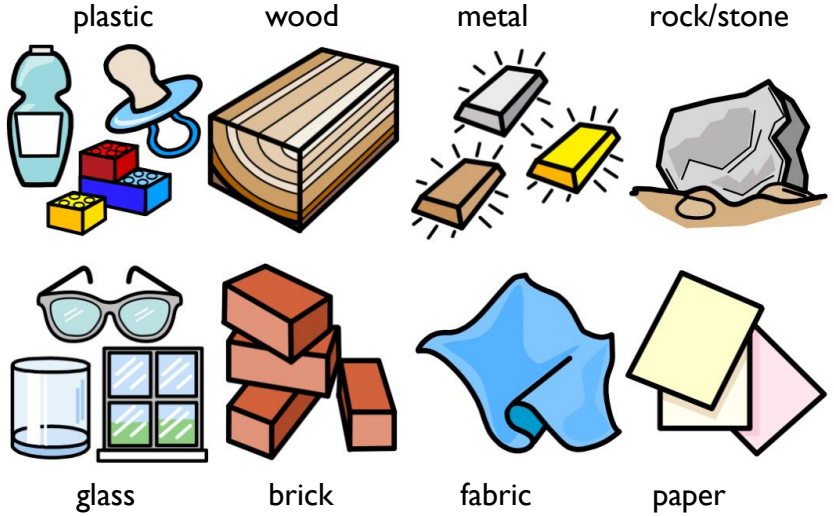
| | | |
|---|---|---|
| object |  | A thing that can be seen, touched and used |
| material |  | Objects are made from materials |
| property |  | This is what a material is like and how it behaves (soft, stretchy, waterproof, etc.) |
| waterproof |  | If something is waterproof, it keeps water out; it can keep things dry |

## Other words or phrases I may use for talking about…

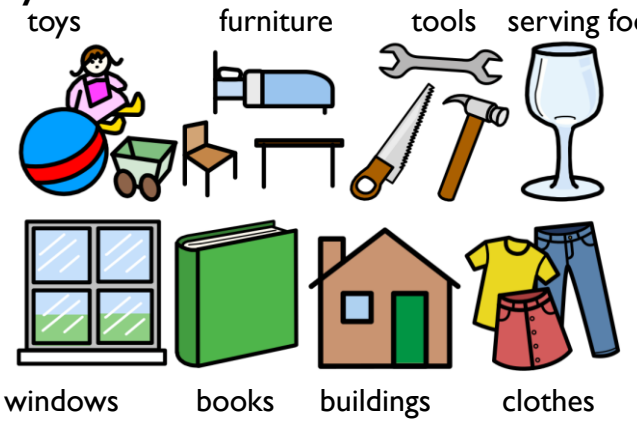
| | | |
|---|---|---|
| …working scientifically |  | up/down, near, close to, old(er), new(er), far, further, high(er), above, centre, low(er), underneath, below, equal to, more/less than, larger/smaller, most/least, half, whole, area, same/different, point, group, nearly, roughly, position, direction, clockwise, distant, pattern, research, non-fiction, event, question, answer |
| …skills |  | guess, explore, test, see/sight, smell, hear, touch, feel, senses |
| …presentation |  | list, tally, table, template, notes, sketch |
| …equipment |  | (egg) timer, clock, ruler, tape measure, metre stick/rule, beaker, scissors, magnifying glass, mirror |
| …materials |  | object, material, wood, plastic, glass, metal, water, rock, rough, smooth, bright/shiny, cloudy, dull/dim |

Think about the different materials you know and the different jobs they might have – can you choose the best material for each job?
Use their properties to help you sort materials into different groups.

## Key materials




## Key uses of materials




These are all things that we use materials for
Do you know which materials are used for each purpose?

Year: One
Term: Autumn 2

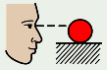
# Science Knowledge Organiser
# Seasonal Changes

SUPER 6

| | |
|---|---|
| • I can observe changes across the four seasons | Red / Orange / Green |
| • I can observe and describe weather associated with the seasons | Red / Orange / Green |
| • I can how the length of days changes at different times of the year | Red / Orange / Green |
| • I can record simple data to answer questions | Red / Orange / Green |
| • I can observe changes over time | Red / Orange / Green |
| • I can ask questions based on my observations | Red / Orange / Green |

In the United Kingdom, there are 4 seasons. Each season has different weather types.


## I can use common words and phrases relating to science

| | | |
|---|---|---|
| season |  | A time of year with a particular type of weather |
| weather |  | Weather includes the temperature outside, the wind direction and strength, as well as rain, cloud, snow and sun |
| daylight |  | Daylight is when it is light outside; the amount of daylight changes with each season |
| observe |  | Notice or look at something and understand that it is important |

## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | up/down, near, close to, old(er), new(er), far, further, high(er), above, centre, low(er), underneath, below, equal to, more/less than, larger/smaller, most/least, half, whole, area, same/different, point, group, nearly, roughly, position, direction, clockwise, distant, pattern, research, non-fiction, event, question, answer |
| …skills |  | guess, explore, test, see/sight, smell, hear, touch, feel, senses |
| …presentation |  | list, tally, table, template, notes, sketch |
| …equipment |  | (egg) timer, clock, ruler, tape measure, metre stick/rule, beaker, scissors, magnifying glass, mirror |
| …sound, light, Earth and space |  | weather, hot, cold, wind, rain, snow, ice, rain gauge, wind sock, wind vane, seasons, autumn, winter, spring, summer, day, length, month, year, light, dark(ness), shadow, bright/dim, moon, movement, rainbow |

The weather starts to get colder in **autumn**. Leaves change colour and fall off the trees.

**Winter** is cold, wet and windy. It snows in some places and gets dark early.

**Spring** brings warmer weather. Flowers start to grow and baby lambs are born.

In **summer**, the weather becomes hotter; there is often less rain, but there may be thunderstorms.

| Month | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | June | July | Aug |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hours of Daylight | 13 | 11 | 9 | 8 | 8 | 10 | 12 | 14 | 15 | 16 | 16 | 14 |

**Did you know?**
Days are longer in the summer months, and shorter in the winter months.

Year: Two
Term: Autumn 1

# Science Knowledge Organiser
# Living Things and their Habitats (Part 1)

SUPER 6

- I can identify that most living things live in habitats to which they are suited
- I can explain how different habitats provide the basic needs of plants and animals
- I can identify and name a variety of plants and animals in their habitats, including microhabitats
- With support, I can communicate my findings using speech or writing, and use scientific language
- I can ask simple questions and recognise they can be answered in different ways
- I can use my observations to identify, describe, compare and group, and explain my reasons

| | |
|---|---|
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |

All living things have seven characteristics
These are called **life processes**

**M**ovement, **R**espiration, **S**ensitivity, **G**rowth, **R**eproduction, **E**xcretion, **N**utrition

## I can use a wide variety of everyday scientific terms

| | | |
|---|---|---|
| depend |  | Many living things in a habitat depend on each other; this means they need each other for different things |
| survive |  | Stay alive |
| habitat |  | A habitat is the natural place something lives; a habitat provides living things with everything they need to survive (food, shelter, water, etc.) |
| microhabitat |  | A microhabitat is a very small habitat in places like under a rock, under leaves, or on a branch; minibeasts often live in microhabitats |

## Other words or phrases I may use for talking about…

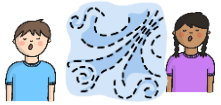
| | | |
|---|---|---|
| …working scientifically |  | left, right, beyond, represents, stands for, exact(ly), nearest, distance, contains, property, appearance, similarity, difference, symmetrical, fractions, amount, scale, fair test, document, strategy |
| …skills |  | gather, collect, notice, link, describe, predict, result, conclude, contrast, order, value, rank, sort |
| …presentation |  | record(ing), pictogram, tally chart, block diagram, Venn diagram, jottings plan |
| …equipment |  | equipment, stop-watch, pipette, beaker, syringe, weight, thermometer, measuring scales, tube, tweeze, net, set square, insect viewer, pooter |
| …habitats |  | (micro)habitat (and name some), microscopic, environment, surroundings, conditions (and describe them), life cycle, food chain, food source, predator, prey, variety, produce, reproduce, suited, adapted |

To stay alive and healthy, you and all other living things need certain conditions that let them carry out the seven **life processes**


Food and water



Space to move, grow and have young


Air or oxygen


Shelter and safety

Turtles and tortoises may look similar, but there are some key differences
What are these differences and how are these animals adapted to their environments?

Some common **habitats** in the United Kingdom are:

urban 


ponds, lakes and rivers


woodland


coastal

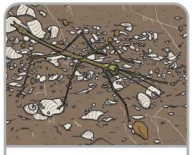
What different animals might live in these habitats?
How do these habitats provide for the plants and animals that live there?


short grass

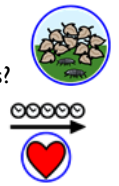

flowers


inside rotting wood


under leaves


in and on soil

These are some common **microhabitats**; what animals do you think might live here?
What types of **microhabitats** might we find on the school site or in the surrounding areas?
Animals need different things to **survive**; what will they find in these **microhabitats** that will help them to do this?



Year: Two
Term: Autumn 2

# Science Knowledge Organiser
# Living Things and their Habitats (Part 2)

SUPER 6

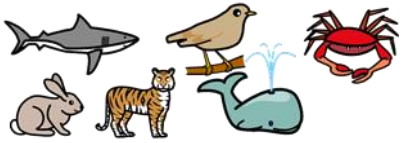
- I can identify and name a variety of plants and animals in their habitats, including microhabitats — Red / Orange / Green
- I can explain how plants and animals can depend on each other — Red / Orange / Green
- I can explain how animals obtain their food from plants and other animals, using the idea of a simple food chain — Red / Orange / Green
- I can observe and comment on patterns and relationships — Red / Orange / Green
- I can use my observations to answer questions — Red / Orange / Green
- With support, I can record data in different ways to answer questions — Red / Orange / Green

## I can use a wide variety of everyday scientific terms

| | | |
|---|---|---|
| food chain |  | A food chain shows how each animal gets its food; food chains are one way that living things depend on each other |
| food source |  | This is the place a living thing gets its food from |
| habitat |  | A habitat is the natural place something lives; a habitat provides living things with everything they need to survive (food, shelter, water, etc.) |
| microhabitat |  | A microhabitat is a very small habitat in places like under a rock, under leaves, or on a branch; minibeasts often live in microhabitats |

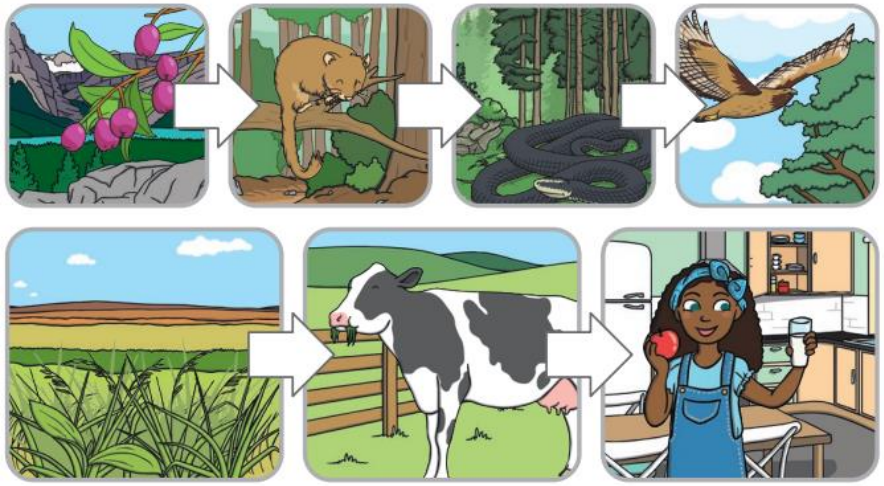
## Other words or phrases I may use for talking about…

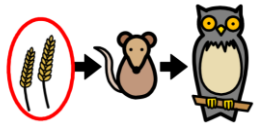
| | | |
|---|---|---|
| …working scientifically |  | left, right, beyond, represents, stands for, exact(ly), nearest, distance, contains, property, appearance, similarity, difference, symmetrical, fractions, amount, scale, fair test, document, strategy |
| …skills |  | gather, collect, notice, link, describe, predict, result, conclude, contrast, order, value, rank, sort |
| …presentation |  | record(ing), pictogram, tally chart, block diagram, Venn diagram, jottings plan |
| …equipment |  | equipment, stop-watch, pipette, beaker, syringe, weight, thermometer, measuring scales, tube, tweeze, net, set square, insect viewer, pooter |
| …habitats |  | (micro)habitat (and name some), microscopic, environment, surroundings, conditions (and describe them), life cycle, food chain, food source, predator, prey, variety, produce, reproduce, suited, adapted |



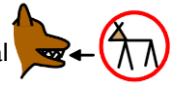
Different animals will have different **food sources**; what do you think these animals will eat? How will they get their food?

These are **food chains**
The arrows mean 'is eaten by'





**Producers** start every food chain
They are usually plants that get their energy from the sun

An animal is **prey** if it is eaten by another animal 

**Predators** are animals that eat other animals

Animals can be **prey** and a **predator**; the owl in this food chain is **prey** because it is eaten by the wolf, and a **predator** because it eats the mouse

Year: Three
Term: Autumn 1

# Science Knowledge Organiser
# Rocks

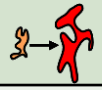
SUPER 6

- I can use my observations to identify differences and similarities, using a range of equipment
- I can use my observations to make predictions for the next set of results
- I can use my results to draw simple conclusions and report on these using speech and writing
- I can compare and group together different kinds of rocks based on their appearances and physical properties
- I can describe how fossils are formed in simple terms
- I can explain what soils are made from

| | |
|---|---|
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |
| Red / Orange / Green | |

In this unit, you will learn about **rocks**, **soils**, and **fossils**.

## I can start using specialist vocabulary and scientific terms

| | | |
|---|---|---|
| igneous rock |  | Rocks that are formed from magma or lava |
| sedimentary rock |  | Rock that has been formed by layers of sediment being pressed down hard and sticking together; you can sometimes see the layers of sediment in the rock |
| metamorphic rock |  | Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure |
| soil |  | The uppermost layer of the earth; it is made of different things including: minerals, air, water, organic material |
| erosion |  | When water, wind, ice, or other weather, wears away rocks and land |

## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | corresponding, equivalent, group, positive/negative, area (maths meaning), parallel, degrees, acute, obtuse, quantity, round, up/down, approximate(ly), remainder, data logger, obstacle, outcome, impact, relationship, necessary, evidence, fact/opinion, data, hypothesis, theory, case study, primary/secondary source |
| …skills |  | estimate, observe, organise, identify, assume, compare, interpret, disprove, infer, clarify, introduce |
| …presentation |  | present findings, abbreviations, frequency table, bar charts, Carroll diagram, flow chart, grid, database, row, column, subdivisions |
| …equipment |  | apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass |
| …materials |  | artificial, organic, chemical, mineral, resources, boulder, cobble, pebble, granule, sand, silt, clay, slate, dissolve, marble, granite, sandstone, chalk, limestone, quartz, absorb(ent), porous, (im)permeable, characteristic, fossil, grains, particles, crystals, layers, texture, powder, magma, lava, igneous, metamorphic, sedimentary, opaque, translucent, surface |

There are three types of naturally occurring rocks: **igneous**, **metamorphic** and **sedimentary**.

| Natural Rocks | | | Human-Made Rocks |
|---|---|---|---|
| Igneous | Sedimentary | Metamorphic | |
| Obsidian | Chalk | Marble | Brick |
| Granite | Sandstone | Quartzite | Concrete |
| Basalt | Limestone | Slate | Coade Stone |

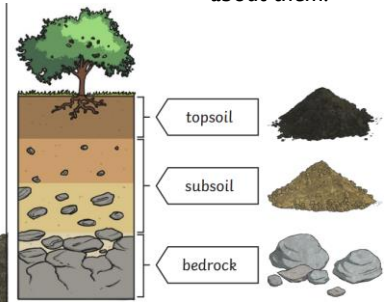
Different rocks will have different **properties**; you will need to identify differences and similarities between the rocks to compare them and draw conclusions about them.

## Soil

Did you know that soil degradation is a massive problem for farmers all over the world? Soil is a priceless, non-renewable resource.
Scientists are trying to discover the best ways to look after soil.

Soil is the uppermost layer of the Earth. It is a mixture of different things:

- minerals (the minerals in soil come from finely broken-down rock);
- air;
- water;
- organic matter (including living and dead plants and animals).




## How fossils are formed

An animal dies. It gets covered with **sediments** which eventually become rock.

More layers of rock cover it. Only hard parts of the creature remain, e.g. bones, shells and teeth.

Over thousands of years, **sediment** might enter the mould to make a **cast fossil**. Bones may change to mineral but will stay the same shape.

Changes in sea level take place over a long period.

As **erosion** and weathering take place, eventually the fossil becomes exposed.

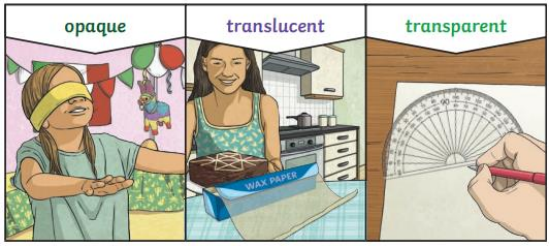
Year: Three
Term: Autumn 2

# Science Knowledge Organiser
# Light

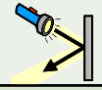
SUPER 6

- I am beginning to use standard units of measurement when recording data
- I know that I need light in order to see things and that dark is the absence of light
- I notice that light is reflected from surfaces
- I can explain how light can be dangerous and know how to protect my eyes
- I can explain how shadows are formed
- I can find patterns in the ways that shadows change

| | | |
|---|---|---|
| Red / Orange / Green | | |
| Red / Orange / Green | | |
| Red / Orange / Green | | |
| Red / Orange / Green | | |
| Red / Orange / Green | | |
| Red / Orange / Green | | |

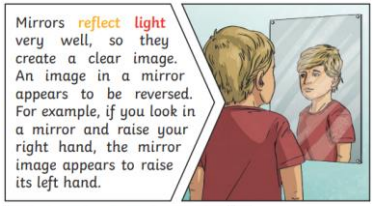



## I can start using specialist vocabulary and scientific terms

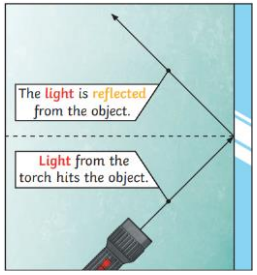
| | | |
|---|---|---|
| light source |  | A object that creates light |
| reflect |  | To bounce off; mirrors work by reflecting light |
| dark |  | The absence of light |
| shadow |  | An area of darkness where light has been blocked |
| opaque |  | Describes objects that do not let any light pass through them |

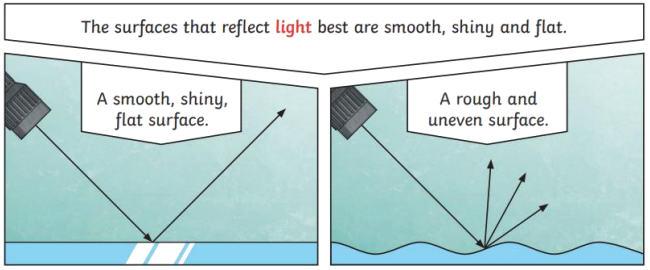
## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | corresponding, equivalent, group, positive/negative, area (maths meaning), parallel, degrees, acute, obtuse, quantity, round, up/down, approximate(ly), remainder, data logger, obstacle, outcome, impact, relationship, necessary, evidence, fact/opinion, data, hypothesis, theory, case study, primary/secondary source |
| …skills |  | estimate, observe, organise, identify, assume, compare, interpret, disprove, infer, clarify, introduce |
| …presentation |  | present findings, abbreviations, frequency table, bar charts, Carroll diagram, flow chart, grid, database, row, column, subdivisions |
| …equipment |  | apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass |
| …sound, light, Earth and space |  | light source (and names), light wave, reflect(ive), mirror, block/absorb, opaque, light beam, speed of light, emit, light spectrum, prism, lens, kaleidoscope, solar system, phases of moon (new, crescent, quarter, gibbous, wax, wane), sundial |

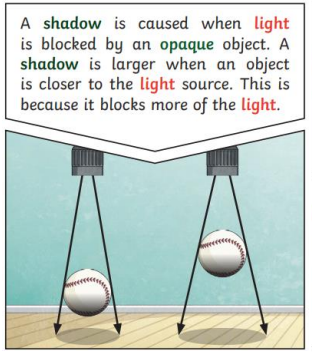


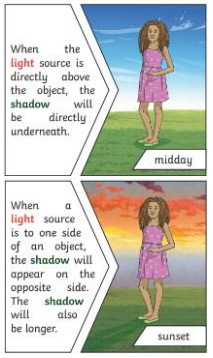

Can you think of ways to check if objects are **transparent**, **translucent**, or **opaque**?




We need light to see things. Light travels in straight lines from a **light source**. The light will **reflect** off an object, and into our eyes. Some objects reflect light well (like hi-vis jackets), and others do not.




What equipment could you use to measure the length of shadows at different times of day?

Do you think shadows will be different depending on the time of year? How could you investigate this?

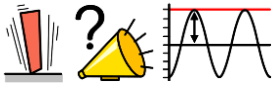
Year: Four
Term: Autumn 1

# Science Knowledge Organiser
# Sound

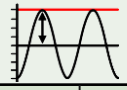
SUPER 6

- I can ask questions and use different types of scientific enquiries and evidence to answer them — Red / Orange / Green
- I can explain how sounds are made — Red / Orange / Green
- I can describe how sounds travel through a medium to my ear — Red / Orange / Green
- I can find patterns between the pitch of a sound and the object that produced the sound — Red / Orange / Green
- I can find patterns between the volume of a sound and the strength of vibrations — Red / Orange / Green
- I can explain how sounds change as the distance from the object increases — Red / Orange / Green

**Sound** is a type of energy; it is caused by **vibrations**. The bigger the **vibration**, the louder the sound!



## I can use specialist vocabulary and scientific terms

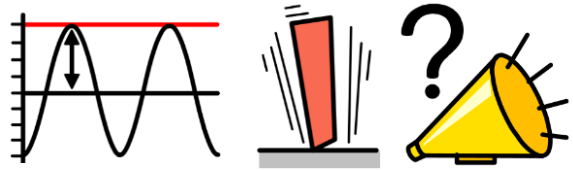
| | | |
|---|---|---|
| vibration |  | A backwards and forwards movement |
| sound wave |  | Vibrations that travel from a source of sound |
| volume |  | How loud a sound is |
| amplitude |  | The size of a vibration; a larger amplitude, the louder the sound |
| pitch |  | How high or low a sound is |

## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | increase/decrease, factor, negative numbers, base, spherical, cylindrical, etc. (3D shape terminology for description), concave, convex, translation, rotation, origin, statistics, typical, exception, unique, intricate, trend, precise, accurate, comparative, systematic, convention, reliability |
| …skills |  | classify, categorise, hypothesise, critique, summarise |
| …presentation |  | communicate, time graph, quantitative/qualitative, plot, continuous data, grouped data, discrete data, format |
| …equipment |  | aquarium, Pasteur, pipette, forceps |
| …sound, light, Earth and space |  | sound source, wave, noise, vibrate, vibration, pollution, pitch, volume, dynamic, echo, tuning fork, tone, muffle, mute, soundproof, drum, guitar, instrument families, percussion, timpani, string, brass, woodwind, soprano, alto, tenor, bass |

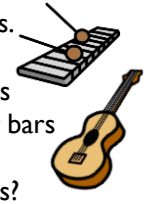
Did you know? Sounds can travel through solids, liquids and gases but they can travel best in solids because of how the particles are arranged!

**Amplitude** is another word for the size of a vibration, louder sounds have a larger amplitude.

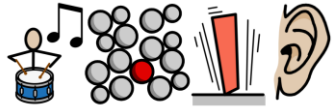


**Pitch** is a measure of how **high** or **low** a sound is. A whistle creates a **high-pitched** sound; a rumble of thunder is an example of a **low-pitched** sound.
Faster **vibrations** create higher sounds; slower ones created lower sounds.

You can use instruments to create sounds with different pitches. Different instruments do this in different ways.
If you are playing a glockenspiel, beating the smaller bars creates faster vibrations and a higher-pitched sound. Beating the larger bars creates slower vibrations and a lower sound.
Do you know how to change the pitch of any other instruments?



When you hit a drum, the skin **vibrates**
This makes the air **particles** closest to the drum vibrate as well.
The vibrations pass on to the next air particle, and the next, and so on until the vibrations eventually travel into your **ear**.



If you throw a stone in a pond, you will see ripples spread out from where it hit the water. The ripples get weaker the further they travel; sound waves are like this and so sounds get quieter the further away from the source you go.

Year: Four
Term: Autumn 2

# Science Knowledge Organiser
# Animals, Including Humans

SUPER 6

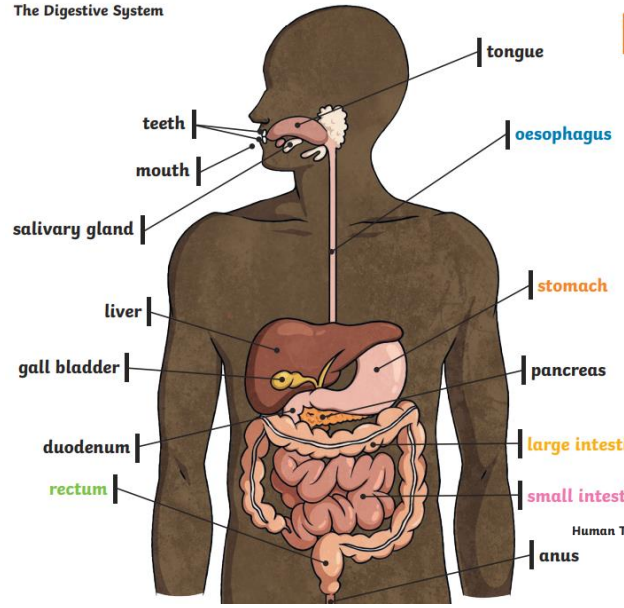
| | |
|---|---|
| • I can use key scientific vocabulary when making predictions | Red / Orange / Green |
| • I can use relevant scientific vocabulary to communicate my findings in ways that are appropriate for different audiences | Red / Orange / Green |
| • I can describe the simple functions of the basic parts of the human digestive system | Red / Orange / Green |
| • I can explain how diet and exercise can affect the human digestive system | Red / Orange / Green |
| • I can identify different types of human teeth and their simple functions | Red / Orange / Green |
| • I can construct and interpret a variety of food chains and identify producers, predators and prey | Red / Orange / Green |

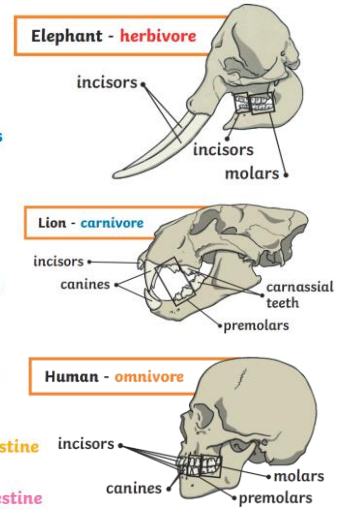
## I can use specialist vocabulary and scientific terms

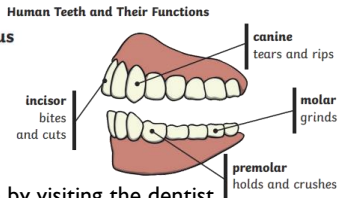
| | | |
|---|---|---|
| producer |  | An organism, usually a plant, that produces its own food and starts a food chain |
| prey |  | An animal that gets hunted and eaten by another animal |
| predator |  | An animal that hunts and eats other animals |
| digestive system |  | The series of organs in the body that help break down food into nutrients that can be absorbed and used by the body |
| teeth |  | The set of hard, bony, enamel-coated structures in the jaws of most vertebrates that are used for biting and chewing |

## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | increase/decrease, factor, negative numbers, base, spherical, cylindrical, etc. (3D shape terminology for description), concave, convex, translation, rotation, origin, statistics, typical, exception, unique, intricate, trend, precise, accurate, comparative, systematic, convention, reliability |
| …skills |  | classify, categorise, hypothesise, critique, summarise |
| …presentation |  | communicate, time graph, quantitative/qualitative, plot, continuous data, grouped data, discrete data, format |
| …equipment |  | aquarium, Pasteur, pipette, forceps |
| …animals, including humans |  | digestive system, digestion, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, faeces, excrete, chemical, breakdown, gastric juices, reabsorb, reabsorption, endoskeleton, exoskeleton |
| …health and nutrition |  | dentin, plaque, pulp-cavity, fluoride, tooth decay, gums, nerves, enamel, canines, incisors, pre-molars, molars, cavities, decay |



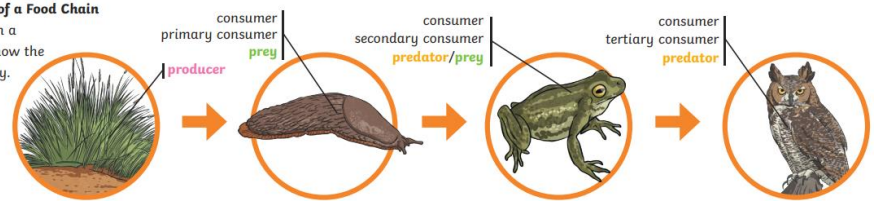




**Mammals** will have different teeth based on their **diets** (**herbivores**, **carnivores**, or **omnivores**)

You can look after your teeth by visiting the dentist regularly, limiting the amount of sugary foods and drinks you have, and brushing your teeth twice a day.

**An Example of a Food Chain**

The arrows in a food chain show the flow of energy.



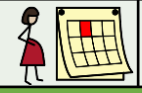
Year: Five
Term: Autumn 1

# Science Knowledge Organiser
# Living Things and Their Habitats

SUPER 6

| | |
|---|---|
| • I can plan different types of scientific enquiries to answer questions | Red / Orange / Green |
| • I can make my own decisions about what observations and measurements to take, and what equipment I will use | Red / Orange / Green |
| • I can report and present my findings and discuss conclusions and causal relationships orally and in writing | Red / Orange / Green |
| • I can use relevant scientific language and illustrations to discuss and communicate my findings | Red / Orange / Green |
| • I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird | Red / Orange / Green |
| • I can describe the life process of reproduction in some plants and animals | Red / Orange / Green |

## I can use specialist vocabulary and scientific terms in appropriate ways

| | | |
|---|---|---|
| reproduction |  | The process of new living things being made |
| life cycle |  | The journey of changes that take place throughout the life of a living thing, including birth, growing up and reproduction |
| metamorphosis |  | A sudden and obvious change in the structure of an animal's body and behaviour |
| asexual reproduction |  | One parent is needed to create an offspring, which is an exact copy of the parent |
| sexual reproduction |  | Two parents are needed to make offspring which are similar, but not identical to, their parents |
| gestation |  | The length of a pregnancy |

## Other words or phrases I may use for talking about…

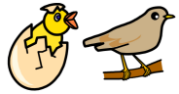
| | | |
|---|---|---|
| …working scientifically |  | percentage, distribution, causal, correlate, dependent, variable, control, cancel out, imperial units, maximum, minimum, million, diagonal, reflex angle, rotation, sparse, abundant, capacity, phenomenon, exceptional, crucial, complex, sustain, perspective, rigorous |
| …skills |  | refute, inform, generalise, verify |
| …presentation |  | line graph, scatter graph, average, mode, range, sieve |
| …equipment |  | funnel, filter, paper |
| …habitats |  | sexual reproduction, asexual reproduction, interdependence, topography, erosion |

**Humans** are **mammals**. Most mammals develop inside their mothers and may feed from their mother's milk. Humans are dependent on their parents for many years until they can look after themselves.

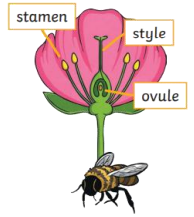
**Amphibians** (such as frogs) are laid in eggs. After hatching, they go through many changes before they become **adults**.

Some animals, such as **butterflies**, go through **metamorphosis** to become an adult.

**Birds** are hatched from eggs and are looked after by their parents until they can live independently.



**Mammals** use **sexual reproduction** to produce offspring.
A **male** sex cell (**sperm**) **fertilises** the **female** sex cells.
The fertilised cell divides into different cells, before forming a baby inside the mother.
The unborn baby will grow inside the mother until the end of the **gestation** period when the baby is born,
Different mammals have different gestation periods.
Some mammals – like platypuses – lay eggs!




Most **plants** contain the **male** sex cell (**pollen**) and the **female** sex cell (**ovules**) but cannot **fertilise** themselves. Wind and insects can help to transfer pollen to a different plant.

Some plants, including strawberry plants, potatoes, spider plants and daffodils, use **asexual reproduction** to create new plants. The new plants are identical to the parent plants.

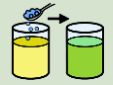
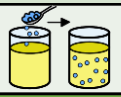
Year: Five
Term: Autumn 2

# Science Knowledge Organiser
# Properties and Changes of Materials

SUPER 6

| | |
|---|---|
| • I can use my test results to make more accurate predictions | Red / Orange / Green |
| • I can explain my predictions with reasoning | Red / Orange / Green |
| • I can set up further comparative and fair tests based on my previous test results | Red / Orange / Green |
| • I can compare and group together everyday materials on basis of their properties including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets | Red / Orange / Green |
| • I know that some materials with dissolve in a liquid to form a solution, and know how to recover a substance from a solution | Red / Orange / Green |
| • I can use my knowledge of states of matter to decide how mixtures might be separated through filtering, sieving and evaporating | Red / Orange / Green |

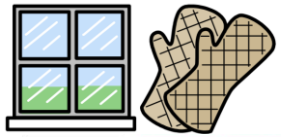
## I can use specialist vocabulary and scientific terms in appropriate ways

| | | |
|---|---|---|
| melting |  | When a solid changes into a liquid because of heat; different solids will melt at different temperatures |
| freezing |  | When a liquid cools and turns into a solid |
| evaporating |  | When a liquid turns into a gas or vapour |
| condensing |  | When a gas or vapour will turn into a liquid |
| solution |  | A solution is made when solid particles are mixed with a liquid and the particles dissolve (like sugar and water) |
| suspension |  | A suspension is make when solid particles are mixed with a liquid and the particles do not dissolve (like sand and water) |

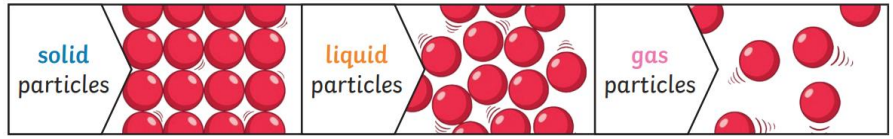
## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | percentage, distribution, causal, correlate, dependent, variable, control, cancel out, imperial units, maximum, minimum, million, diagonal, reflex angle, rotation, sparse, abundant, capacity, phenomenon, exceptional, crucial, complex, sustain, perspective, rigorous |
| …skills |  | refute, inform, generalise, verify |
| …presentation |  | line graph, scatter graph, average, mode, range, sieve |
| …equipment |  | funnel, filter, paper |
| …materials |  | soluble, solution, solute, solvent, suspension, filter mixture, residue, filtrate, separation, buoyancy, (ir)reversible change, conductor, thermal, insulator, insulation, combustion, reaction |

Did you know?
Different materials are used for particular jobs based on their **properties**: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency are some of the properties that scientists, designers and engineers consider when making new products.

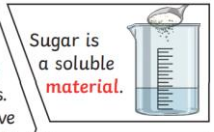


What properties does glass have that make it good for windows?
What properties would you need when choosing material for oven gloves?

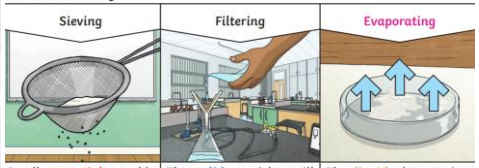



Some materials can change their state from solid, to liquid and gas, and vice versa. Some of these changes are **reversible** and some are **irreversible.**

**Dissolving**
A solution is made when solid particles are mixed with liquid particles. Materials that will dissolve are known as soluble. Materials that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.




Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by:




Smaller materials are able to fall through the holes in the sieve, separating them from larger particles.

The solid particles will get caught in the filter paper but the liquid will be able to get through.

The liquid changes into a gas, leaving the solid particles behind.

Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.

Vinegar and bicarbonate of soda is an interesting reaction. Do you think it would be **reversible** or **irreversible**? Why?

Year: Six
Term: Autumn 1

# Science Knowledge Organiser
# Living Things and Their Habitats

SUPER 6

- I can describe how living things are classified into groups based on their observable characteristics
- I can give reasons for classifying plants and animals based on their characteristics
- I can present my findings in a variety of ways
- I can use relevant scientific language and illustrations to discuss, communicate and justify my ideas
- I can say which secondary sources will be most useful to research my ideas
- I can identify and use scientific evidence to support or refute ideas and arguments

Red / Orange / Green
Red / Orange / Green
Red / Orange / Green
Red / Orange / Green
Red / Orange / Green
Red / Orange / Green

In this unit, you will sort living things based on their **characteristics**. You will have to **sort animals**, **plants** and **microorganisms**!

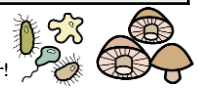
## I can use specialist vocabulary and scientific terms in sophisticated ways

| | | |
|---|---|---|
| bacteria |  | A type of single-celled microorganism |
| virus |  | A type of microorganism that is smaller and less complex than bacteria; viruses can often cause illnesses |
| fungus (fungi) |  | A group of spore-producing organisms that feed on organic matter, including moulds, yeasts and mushrooms |
| species |  | A group of animals that can reproduce to create fertile offspring |
| microorganism |  | A very small living thing that can only be seen with a microscope or other magnification method |
| taxonomy |  | The branch of science concerned with classification, especially of living things |

## Other words or phrases I may use for talking about…

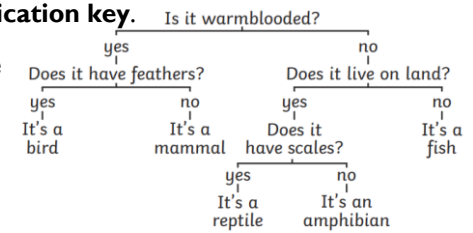
| | | |
|---|---|---|
| …working scientifically |  | recurring, proportion, ratio, radius, diameter, circumference, concentric, arc, intersecting, plane, cross-section, appropriate accuracy, degree of trust, robust, authentic, plausible, controversy, stance, bias, tertiary source |
| …skills |  | determine, attribute, analyse, corroborate, discern, epitomise, characterise, extrapolate |
| …presentation |  | pie charts, mean, four quadrants |
| …living things and their habitats |  | (micro)organism, species, microbes, evolution, evolutionary change, natural selection, adaptation, competition, genes, dominant, recessive, DNA, chromosomes, inherit(ance), survival of the fittest, fossil record |

**Did you know?** There are an estimated 30 trillion cells in your body and less than a third are human. The other 70-90% are bacterial and fungal. Scientists estimate that ninety-nine percent of the unique genes in your body are bacterial. Only about one percent is human. Because they are so small, they only make up 1-3% of the mass, however!



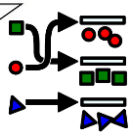
Scientists called **taxonomists** sort living things into different groups. One way of doing this is by using a **classification key**.

**Carl Linnaeus** was one of the first people to do this and an adapted version of his **Linnaeus System** is still used today!




The Linnaeus System works by classifying things into eight different levels. The number of living things in each level gets smaller until only one animal is left in the species level.

| | |
|---|---|
| **Domain:** Eukarya | jackal, clownfish, cat, dog, ladybird, daisy, rabbit, fox |
| **Kingdom:** Animalia | jackal, clownfish, cat, dog, ladybird, rabbit, fox |
| **Phylum:** Chordata | jackal, clownfish, cat, dog, rabbit, fox |
| **Class:** Mammalia | jackal, cat, dog, rabbit, fox |
| **Order:** Carnivora | jackal, cat, dog, fox |
| **Family:** Canidae | jackal, dog, fox |
| **Genus:** Canis | jackal, dog |
| **Species:** Lupus | dog |



Each group allows scientists to observe and understand the characteristics of living things more clearly. They group similar things together then split the groups again and again based on their differences.

**Microorganisms** include **viruses**, **bacteria**, **moulds** and **yeast** (yeast and mould are both types of fungi). Some animals (dust mites) and plants (phytoplankton) are also microorganisms. Microorganisms are very tiny living things that can only be seen using a microscope. They can be found in and on our bodies, in the air, in water and on objects around us.

| Helpful Microbes | Harmful Microbes |
|---|---|
| Bacteria – cheese | Bacteria – salmonella is a bacterium that can lead to food poisoning |
| Yeast – wine | Virus – chicken pox and flu are examples of viral diseases |
| Bacteria – yoghurt | Fungi – athlete's foot |
| Yeast – bread dough | Bacteria – plaque |
| Penicillium fungi - antibiotics | Fungi - mould |

Year: Six
Term: Autumn 2

# Science Knowledge Organiser
# Animals, Including Humans

SUPER 6

| | |
|---|---|
| • I can decide if I need to repeat my measurements and explain why | Red / Orange / Green |
| • I can decide how to record data and results | Red / Orange / Green |
| • I can report and present my findings from enquiries including conclusions, causal relationships and the degree of trust in the results | Red / Orange / Green |
| • I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood | Red / Orange / Green |
| • I recognise the importance of diet, exercise, drugs and lifestyle on the way bodies function | Red / Orange / Green |
| • I can describe the ways in which nutrients and water are transported within animals, including humans | Red / Orange / Green |

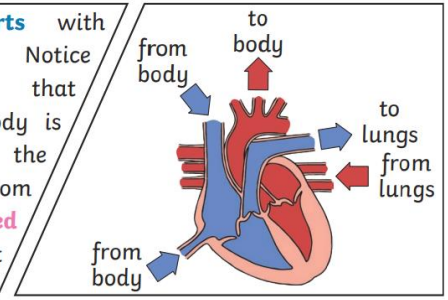
## I can use specialist vocabulary and scientific terms in sophisticated ways

| | | |
|---|---|---|
| drug |  | A substance containing natural or man-made chemicals that has an effect on your body when it enters your system |
| alcohol |  | A drub produced from grains, fruits or vegetables when they are put through a process called fermentation |
| circulatory system |  | A system that includes the heart, veins and arteries that is used for transporting substances around the body |
| heart |  | An organ in the body that is constantly pumping so that blood moves around the body |
| blood vessels |  | Tube-like structures in the body that carry blood through tissues and organs; veins, arteries and capillaries are all types of blood vessel |
| nutrients |  | Substances that animals need to stay healthy |

## Other words or phrases I may use for talking about…

| | | |
|---|---|---|
| …working scientifically |  | recurring, proportion, ratio, radius, diameter, circumference, concentric, arc, intersecting, plane, cross-section, appropriate accuracy, degree of trust, robust, authentic, plausible, controversy, stance, bias, tertiary source |
| …skills |  | determine, attribute, analyse, corroborate, discern, epitomise, characterise, extrapolate |
| …presentation |  | pie charts, mean, four quadrants |
| …animals, including humans |  | circulatory system, blood vessels, capillaries, red blood cells, white blood cells, plasma, haemoglobin, clotting, respiratory system, respire, carbon dioxide, air sacs, (de)oxygenated, aerobic, ventricles, aorta, trachea, diaphragm, bronchi, bronchioles, alveoli, pulmonary, vein, artery, gaseous exchange |
| …health |  | drugs, carbon monoxide |

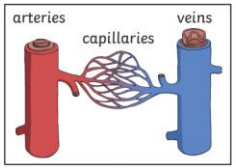
Mammals have **hearts** with four chambers. Notice how the blood that has come from the body is **deoxygenated**, and the blood that has come from the lungs is **oxygenated** again. The blood isn't actually red and blue: we just show it like that on a diagram.



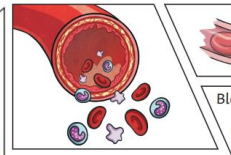

Did you know?
It is a common misconception that blood in human veins is blue. Lobsters have clear blood, but it looks blue when exposed to air due to copper in their blood!

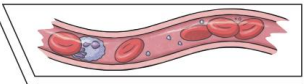

Capillaries are the smallest **blood vessels** in the body and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place.

Arteries carry **oxygenated blood** away from the **heart**.




Veins carry **deoxygenated blood** toward the **heart**.





Blood transports:
- gases (mostly oxygen and carbon dioxide);
- **nutrients** (including water);
- waste products.

The liquid part of blood contains water and protein. This is called plasma.

Plasma is liquid. The other parts of your blood are solid.

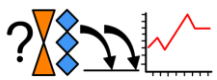
Platelets help you stop bleeding when you get hurt.

Red blood cells carry oxygen through your body.

White blood cells fight infection when you're sick.

**Drugs**, **alcohol** and smoking have negative effects on the body.

A healthy diet involves eating the right types of **nutrients** in the right amounts.



**Good to know!**
Mistakes can happen when taking measurements – this even happens to professional scientists! Look carefully at your results to see if any are **anomalous**; you may need to try your experiment again!

Regular exercise:
- strengthens muscles including the heart muscle;
- improves circulation;
- increases the amount of oxygen around the body;
- releases brain chemicals which help you feel calm and relaxed;
- helps you sleep more easily;
- strengthens bones.

It can even help to stop us from getting ill.