



SUPER 6

- I can distinguish between an object and the material it is made from
- I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock
- I can describe the physical properties of a variety of everyday materials
- I can compare and group everyday materials based on their physical properties
- I can talk about what I found out and how I found it out
- 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

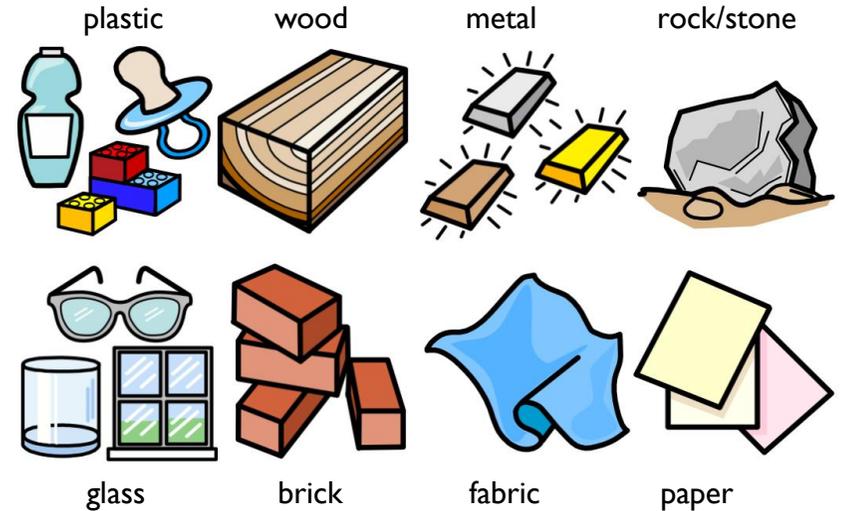
object		A thing that can be seen, touched and used
material		Objects are made from materials
property		This is what a material is like and how it behaves (soft, stretchy, waterproof, etc.)
waterproof		If something is waterproof, it keeps water out; it can keep things dry

Other words or phrases I may use for talking about...

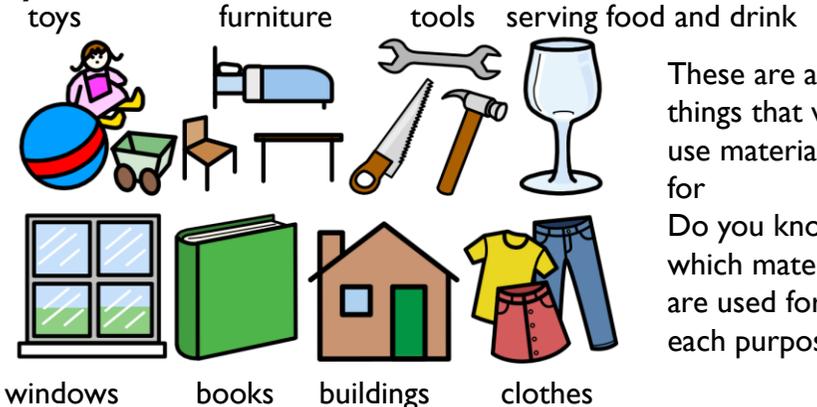
...working scientifically		up/down, near, close to, old(er), new(er), far, further, high(er), above, centre, low(er), underneath, below, equal to, more/less than, larger/smaller, most/least, half, whole, area, same/different, point, group, nearly, roughly, position, direction, clockwise, distant, pattern, 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?



SUPER 6

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

Red / Orange / Green
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



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.



Other words or phrases I may use for talking about...

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...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



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.



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

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



SUPER 6

- I can make verbal predictions based on my observations with support
- I can use the equipment provided for me to perform simple tests that have been planned as a whole class
- I can talk about what I found out and how I found it out
- I am beginning to use scientific language when talking about my results
- I can check my results make sense using peer and self-assessment
- I can check if I have answered the question from the beginning of the test

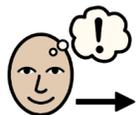
Red / Orange / Green

I can use common words and phrases relating to science

transparent		Transparent objects let light through so we can see through them (like a glass window)
translucent		Translucent objects let some light through so we might see shadows or blurry images through them (like tracing paper)
opaque		Opaque objects do not let any light through so we can not see through them at all (like wood)
predict		When you say what you think will happen and why you think that

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
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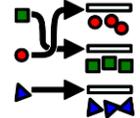
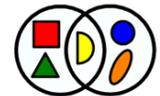


You need to be able to say if you think a material will be transparent or not and explain why; this is called making a **prediction**

Can you test whether materials are **opaque** or **transparent**?



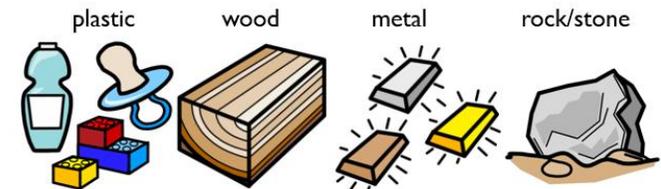
Can you **compare, sort** or **classify** materials on the basis of their transparency? Can you compare how transparent they are?



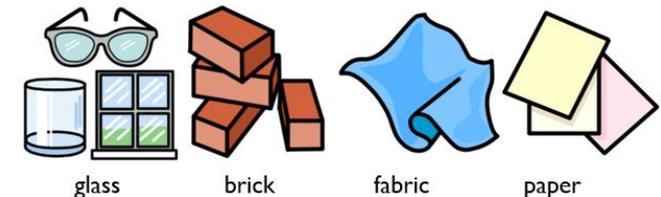
Can you discuss different ways to test transparency? Make sure you use your oracy skills!



Think about **materials** you already know



Which ones are **transparent**?



If materials are transparent, this is one of their **properties**



Can you think of any other materials you could test that are not shown here?



SUPER 6

- I can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- I can identify and name a variety of common animals that are carnivores, herbivores and omnivores
- I am beginning to use scientific language when talking about my results
- I can use my observations to identify, compare and group
- With support, I can use observations to answer questions
- I can make verbal predictions based on my observations with support

Red / Orange / Green

I can use common words and phrases relating to science

carnivore		An animal that mostly eats other animals (meat)
herbivore		An animal that only eats plants
omnivore		An animal that eats both meat and plants
mammal		Mammals are animals that breathe air, grow hair or fur and feed on their mother's milk as a baby

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
...animals, including humans		common animals, wild, tame, pets, fish, bird, reptile, baby, cub, pup, nest, family, egg, mouth, neck, eyes, teeth, wing, claw, tail, beak, fur, feather, fin, scales

Mammals

human mouse dog cow

Birds

penguin chicken flamingo robin

Fish

goldfish tuna shark eel

Reptiles

snake tortoise lizard alligator

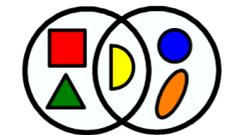
Amphibians

frog toad newt salamander

Can you think of any other animals that will fit into any of these groups?

What type of diets do these animals have?

Can we group these animals in a different way?



Humans are **mammals**
They can eat plants and meat – they are **omnivores**

Rabbits are **mammals**
They only eat plants – they are **herbivores**

Cats are **mammals**
They only eat meat – they are **carnivores**

Robins are **birds**
They eat insects, berries and nuts – they are **omnivores**

Frogs are **amphibians**
Adult frogs eat insects – they are **carnivores**



SUPER 6

- I can identify and name a variety of common wild and garden plants, including types of tree
- I can identify and describe the basic structure of a variety of common flowering plants, including trees
- I can use my observations to identify, compare and group
- With support, I can use observations to answer questions
- I am beginning to use scientific language
- I can have my questions answered by people around me

Red / Orange / Green



I can use common words and phrases relating to science

root		Roots help keep the plant in the ground; roots take in water and nutrients from the soil
stem		The stem holds the plant up and carries water and nutrients from the roots to the leaves and flowers
leaf leaves		Leaves absorb sunlight to help the plant make its own food
seeds		Seeds grow into new plants; seeds come in lots of different shapes and sizes

Plants have different parts
Every part has a different job to do
Wild plants grow where their seeds fall; they do not have to be planted or cared for
People choose to have certain plants in their gardens; these are **garden plants**
People will take care of the plants in their gardens
Trees can be very large plants; they can take a very long time to grow

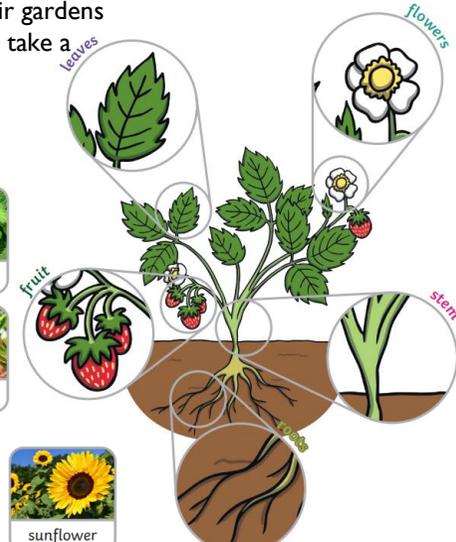
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...presentation		list, tally, table, template, notes, sketch
...equipment		(egg) timer, clock, ruler, tape measure, metre stick/rule, beaker, scissors, magnifying glass, mirror
...plants		leaf/leaves, flower, blossom, trunk, branch, stem, stalk, petal, root, soil, fruit, berry, seed, bulb, food

Wild Plants



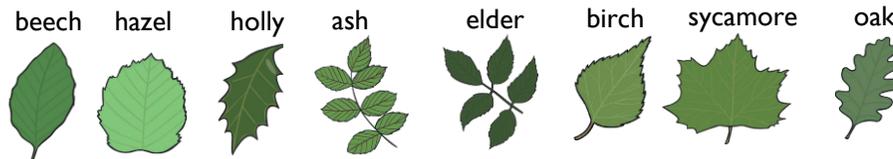
Garden Plants



Trees



Can you identify any plants on the school site?
We can look at the shapes of leaves to identify trees on our school site.





SUPER 6

- I can identify things that are living, dead, and have never been alive
- I can name a variety of different habitats and match animals to their habitats
- I can identify where some animals get their food
- I can check my results make sense using peer and self-assessment
- I can check if I have answered the question from the beginning of the test
- I can use my observations to identify, compare and group

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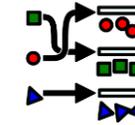
Things that are **living** have all the **life processes**
Things that are **dead** used to be alive; they used to be living
Things that are **never living** have never had life processes; they are usually made of metal, plastic or rock

I can use common words and phrases relating to science

habitat		The natural home of a plant or animal
animal		A living thing that can move, eat and react to the world using its senses
classify		To put things into groups based on their characteristics and properties
life processes		Life processes are the things that all living things do; they move, breath (respire), sense, grown, make new life (reproduce), get rid of waste (excrete), and get their energy from food (nutrition)

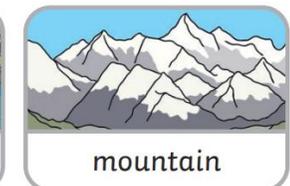
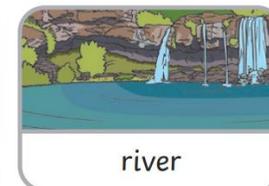
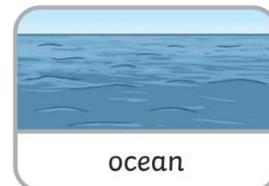
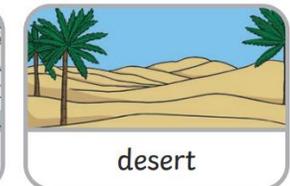
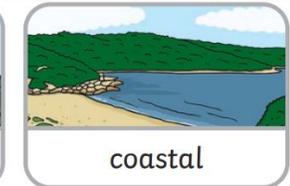
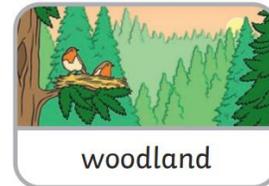


You will need to be able to **sort** (or **classify**) things into different groups
Look at things around you; are they **living**, **dead**, or **never living**?



Other words or phrases I may use for talking about...

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...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
...habitats		living, alive, dead, move, grow, feed, breathe, shelter, meat eater, plant feeder, within



Animals live in lots of different **habitats**
Can you think of any animals that might live in these habitats?



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

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

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?



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

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?

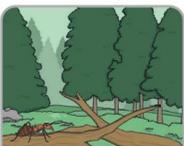
These are some common **microhabitats**; what animals do you think might live here?
What types of **microhabitats** might we find on the school site or in the surrounding areas?
Animals need different things to **survive**; what will they find in these **microhabitats** that will help them to do this?



short grass



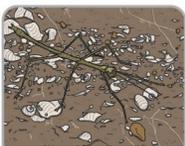
flowers



inside rotting wood



under leaves



in and on soil



SUPER 6

- I can identify and name a variety of plants and animals in their habitats, including microhabitats
- I can explain how plants and animals can depend on each other
- I can explain how animals obtain their food from plants and other animals, using the idea of a simple food chain
- I can observe and comment on patterns and relationships
- I can use my observations to answer questions
- 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

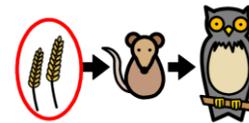
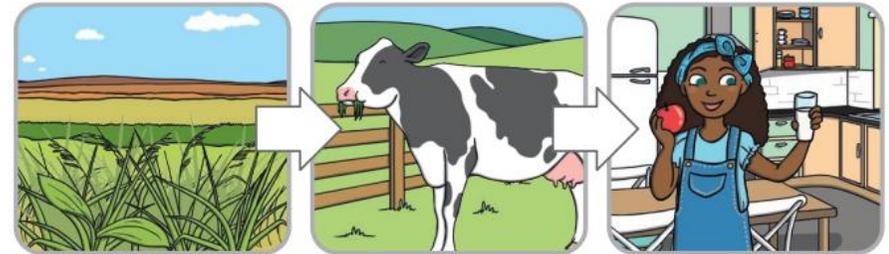
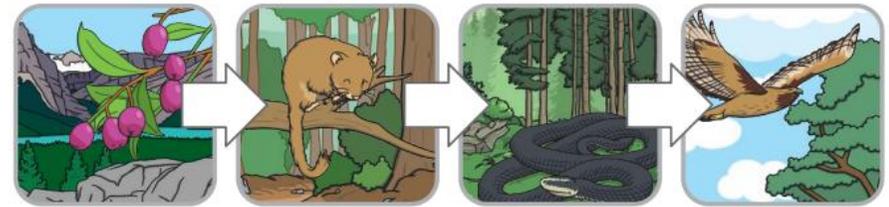
food chain		A food chain shows how each animal gets its food; food chains are one way that living things depend on each other
food source		This is the place a living thing gets its food from
habitat		A habitat is the natural place something lives; a habitat provides living things with everything they 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...

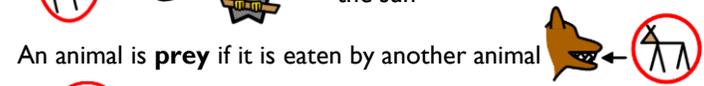
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These are food chains

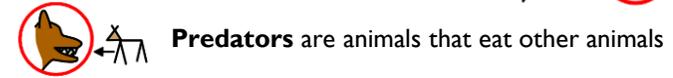
The arrows mean 'is eaten by'



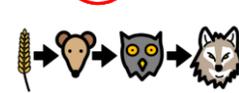
Producers start every food chain
They are usually plants that get their energy from the sun



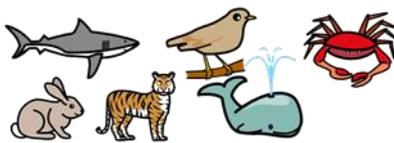
An animal is **prey** if it is eaten by another animal



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



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



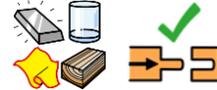


SUPER 6

- I can compare the suitability of everyday materials for particular uses
- I can find out how the shapes of objects made from the same materials can be changed
- I can use presentational talk to explain what I have found out and how I found it out
- I can use my observations to identify, describe, compare and group and explain my reasons
- I can use the equipment provided to perform simple tests
- I can independently make predictions based on my observations

Red / Orange / Green
Red / Orange / Green

In this unit of learning, you will learn about different materials and decide what they can (and can't) be used for – this is **suitability**

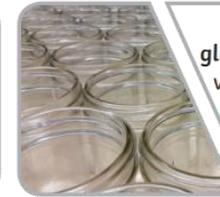


I can use a wide variety of everyday scientific terms

properties		This is what a material is like and how it behaves (soft, stretchy, waterproof, etc.)
suitability		Suitability means having the right properties for a specific purpose (example: a material for a coat being waterproof)
waterproof		Waterproof materials do not let water go through them
predict		Describe what you think will happen in an experiment



wood:
hard, stiff, strong, opaque, can be carved into any shape.



glass:
waterproof, transparent, hard, smooth.



plastic:
waterproof, strong, can be made to be flexible or stiff, smooth or rough.



metal:
strong, hard, easy to wash.

Do you know any other purposes these materials can be used for?

Other words or phrases I may use for talking about...

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...equipment		equipment, stop-watch, pipette, beaker, syringe, weight, thermometer, measuring scales, tube, tweeze, net, set square, insect viewer, pooter
...materials		man-made, natural, suitable, useful, function, purpose, property, rust, transparent, reflection, rigid, flexible, solid, liquid, molten, gas, boiling point, heat, pressure



paper:
lightweight, flexible.



cardboard:
strong, light, stiff.

Do you know any other materials that are not on this knowledge organiser?

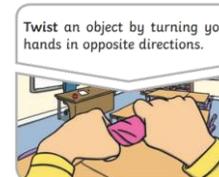


fabric:
soft, flexible, hard-wearing, can be stretchy, warm, absorbent.



rubber:
hard-wearing, elastic, flexible, strong.

You can use your hands to test the **properties** of materials in different ways



You will need to test a variety of different materials
Before each test, you will **predict** what will happen
Use your knowledge from prior learning to help you!



SUPER 6

- I can make changes of my own to tests that have been planned as a whole class
- I can independently make predictions based on my observations
- I can use the equipment provided to perform simple tests
- I can ask simple questions and recognise they can be answered in different ways
- I can check if my results answer my original question and think of follow up questions if I have not
- I can use presentational talk to explain what I have found out and how I found it out

Red / Orange / Green
Red / Orange / Green

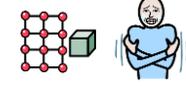
In this series of investigations, you will conduct different experiments with **ice** to learn more about its **properties** and the different **states** that water can exist in



I can use a wide variety of everyday scientific terms

properties		This is what a material is like and how it behaves (soft, stretchy, waterproof, etc.)
state		One of the different ways that things can exist; the three most common states are: solids , liquids and gases
explain		Make an idea clear to someone by including lots of detail and important information
predict		Describe what you think will happen in an experiment

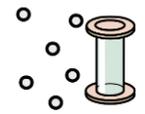
Ice is frozen water
Ice is a **solid**



Water is a **liquid**
When ice **melts**, it becomes liquid water
When we freeze water, it becomes solid ice



Water vapour is a **gas**
When water is heated, or evaporates, it becomes water vapour
When water vapour cools, it becomes liquid water



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
...materials		man-made, natural, suitable, useful, function, purpose, property, rust, transparent, reflection, rigid, flexible, solid, liquid, molten, gas, boiling point, heat, pressure

You will learn more about **states of matter** in year 4!

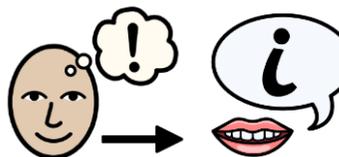
In the winter, we might put **grit** or **salt** on icy paths
Why do you think this happens?
What do you think salt will do to ice?
How else can this knowledge be helpful?



Scientists need to be able to **present** their ideas to other people

Use your **oracy guidelines** to help you be successful when you tell other people your findings

- Take turns listening and talking
- Choose appropriate vocabulary
- Make sure you speak loud enough to be heard
- Give reasons to support your ideas



You might have encountered ice, water, water vapour and steam before
You can use your **prior learning** to make a **prediction** about what will happen in your experiments
You will need to **explain** why you have those ideas



SUPER 6

- I can observe and describe how seeds and bulbs grow into mature plants
- I can find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
- I can independently make predictions based on my observations
- I can observe and comment on patterns and relationships
- I can use my observations to answer questions
- With support, I can record data in different ways to answer questions

Red / Orange / Green

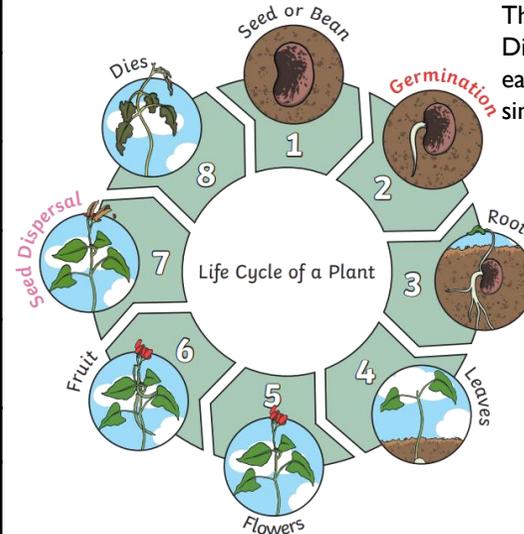
In this unit of learning, you will observe different plants at different points in their lifecycles

I can use a wide variety of everyday scientific terms

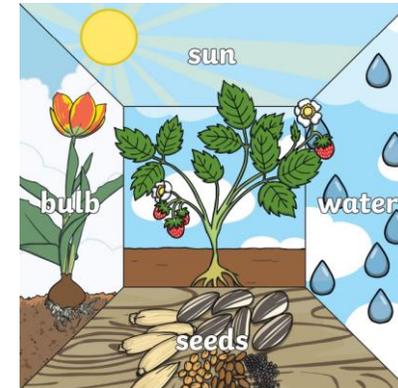
seed		Seeds grow into new plants; they are sometimes found in fruits; seeds can be moved by animals, wind, or in other ways
bulb		Bulbs grow into new plants; these plants start as a seed, then a bulb forms around the seed so the plant can grow again and again, year after year
germination		When the conditions are right, the seed's shell will crack and a tiny shoot will come out – this is germination
nutrition		Nutrition means food or nourishment; plants can make their own food by absorbing sunlight with their leaves

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...equipment		equipment, stop-watch, pipette, beaker, syringe, weight, thermometer, measuring scales, tube, tweezers, net, set square, insect viewer, pooter
...plants		growth, seedling, shoot, mature, healthy, wither, earth, soil, nutrients, structure, function, germinate, pollination, seed dispersal names of locally-found and school-relevant plants, trees and vegetables



This is the lifecycle of a plant
Different plants will look different to each other, but they will all grow in similar ways



If you have the right conditions, a plant will grow
What other things do plants need that are not shown in the picture above?



This picture shows what will happen when a bean is planted in soil
What stages of the lifecycle can you see?



Healthy and unhealthy plants look very different

These are all **seeds**, even though they all look different!
Have you seen any of these seeds before?





SUPER 6

- I notice that animals, including humans, have offspring that grow into adults
- I can describe the basic needs of animals, including humans for survival
- I can describe the importance of exercise, a balanced diet and hygiene for humans
- I can ask simple questions and recognise they can be answered in different ways
- I can begin to use secondary sources to answer my questions
- I can check if my results answer my original question and think of follow up questions if I have not

Red / Orange / Green

I can use a wide variety of everyday scientific terms

life cycle		The changes that living things go through when they are growing and changing
develop		Grow bigger and stronger
offspring		The child of an animal
diet		The food that an animal eats; types of diet include carnivore, herbivore and omnivore

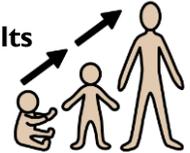
Some animals give birth to **live young**



Some animals lay eggs which the young hatch from



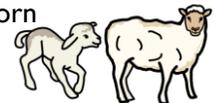
Both of these types of young then **develop** into **adults**



Other words or phrases I may use for talking about...

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...equipment		equipment, stop-watch, pipette, beaker, syringe, weight, thermometer, measuring scales, tube, tweeze, net, set square, insect viewer, pooter
...animals, including humans		amphibian, mammal, adult, young, toddler, child, teenager, develop, insect, live young, brain, heart, lungs, skeleton, bones, eyebrows, wrist, ear, other key body parts

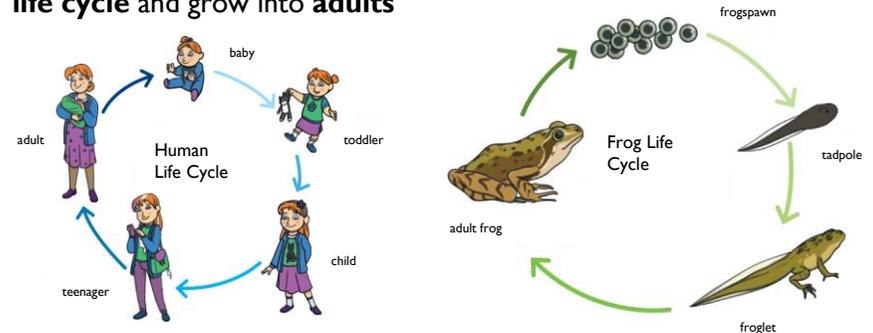
Some **offspring** look like their **adult** when they are born



Some **offspring** do not look like their **adult** when they are born



All **young** animals change as they go through the different stages of their **life cycle** and grow into **adults**



To stay alive, all animals have three basic needs for survival.
air (to breathe) **water** (to drink) **food** (to eat)





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

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

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.

Other words or phrases I may use for talking about...

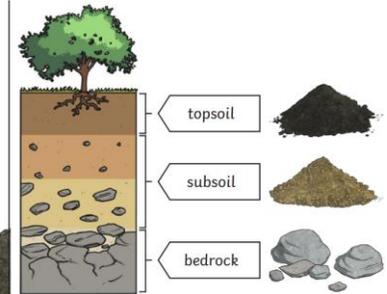
...working scientifically		corresponding, equivalent, group, positive/negative, area (maths meaning), parallel, degrees, acute, obtuse, quantity, round, up/down, approximate(ly), remainder, data logger, obstacle, outcome, impact, relationship, necessary, evidence, fact/opinion, data, hypothesis, theory, case study, primary/secondary source
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...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

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.

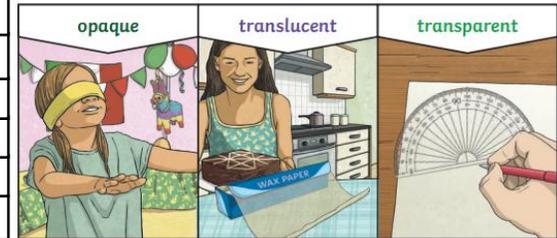




SUPER 6

- 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

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Red / Orange / Green

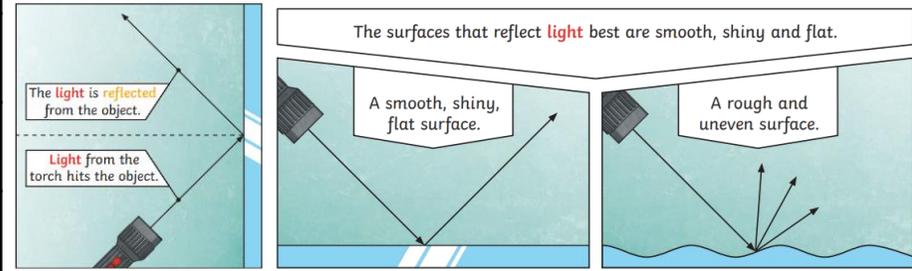


I can start using specialist vocabulary and scientific terms

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

Mirrors **reflect light** very well, so they create a clear image. An image in a mirror appears to be reversed. For example, if you look in a mirror and raise your right hand, the mirror image appears to raise its left hand.

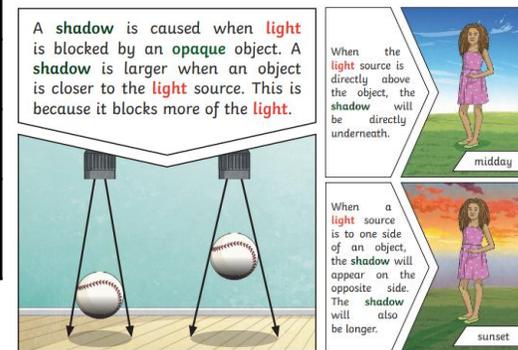
Can you think of ways to check if objects are **transparent**, **translucent**, or **opaque**?



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
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...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

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?



SUPER 6

- With support, and with the equipment provided, I can set up a simple fair test
- I can recognise what a fair test is with support
- I can compare how things move on different surfaces
- I notice that some forces need contact between two objects, but magnetic forces can act at a distance
- I can observe how magnets can attract or repel each other, and how they interact with different materials
- I can make predictions if magnets will attract or repel, based on their poles

Red / Orange / Green
Red / Orange / Green

In this unit, you will learn about **forces**, **magnets** and **magnetism**

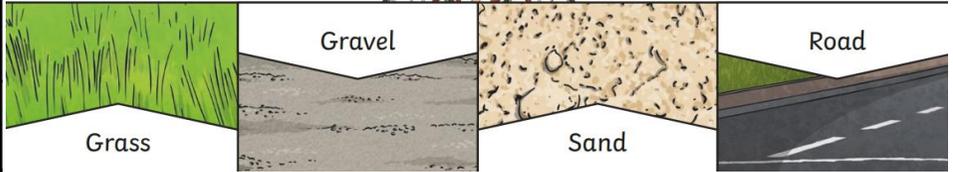
I can start using specialist vocabulary and scientific terms

forces		Pushes or pulls
friction		A force that acts between two surfaces or objects that are moving, or trying to move, across each other
magnet		An object that produces a magnetic force that pulls certain other objects towards it
repel		When two things repel, they push each other away; when the north pole of a magnet is placed near a north pole of another magnet, they will push each other away
attract		When two things attract, they pull each other together; when the north pole of a magnet is placed near the south pole of another magnet, they will pull each other together

Different **surfaces** create different amounts of **friction**. The amount of **friction** created by an object moving over a **surface** depends on the roughness of the **surface** and the object, and the **force** between them.

The driving **force** pushes the bicycle, making it move.

Friction pushes on the bicycle, slowing it down.



Forces will change the motion of an object. They will either make it start to move, speed up, slow it down or even make it stop.

A **magnetic field** is invisible, but you can see the magnetic field that a magnet creates using iron filings on top of a piece of paper and a magnet underneath the paper

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
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...equipment		apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass
...forces		force, gravity, friction, spring, air resistance, streamlined, Newton meter, force meter, magnet(ic), attract, repel, compress, North/South pole, bar/ring/button/horse-shoe magnet

Magnetic ✓	Non-magnetic ✗
<p>These objects contain iron, nickel or cobalt. Not all metals are magnetic.</p>	<p>These objects do not contain iron, nickel or cobalt.</p>

Magnets have two **poles** – a **north pole** and a **south pole**. Opposite poles **attract** (stick together); like poles **repel** (push each other away)

Planet Earth has a magnetic field; the needle in a compass is a magnet as well: this is why a compass needle always points towards north



SUPER 6

- I can use my observations to help identify, classify, find similarities and differences, and identify changes
- I am beginning to use relevant scientific language to discuss my ideas and communicate my findings
- I can use a variety of secondary sources to answer questions
- I can ask questions and use my observations to answer them
- I can discover that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food
- I can explain that humans and some other animals have skeletons and muscles for support, protection and movement

Red / Orange / Green

I can start using specialist vocabulary and scientific terms

vertebrate		Animals that have a backbone, including mammals, birds reptiles, amphibians and fishes
invertebrate		Animals that do not have a backbone, including insects, molluscs, arachnids and annelids
muscles		Soft tissues in the body and contract and relax to create movement
joints		Areas where two or more bones are fitted together
endoskeleton		A skeleton on the inside of the body that provides protection for internal organs and support

contract

relax

Skeletal muscles work in pairs to move the bones that they are attached to; they **contract** (get shorter) and **relax** (get longer)

Skeletons do three important jobs:

1. Protect organs inside the body
2. Allow the body to move (with the muscles)
3. Support the body and stop it from falling on the floor

Animals with **endoskeletons** are called **vertebrates**; humans and other mammals are vertebrates

Not all animals have endoskeletons; these are called **invertebrates**

Some animals have **exoskeletons** – these are a skeleton on the outside of the body that supports it (insects, arachnids, etc.)

Other words or phrases I may use for talking about...

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...equipment		apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass
...animals, including humans		(in)vertebrates, offspring, survival, childhood/babyhood/adulthood, brain, heart, vein, artery, skull, ribs, spine/backbone, joints, sockets, bones, muscles, contraction, tendons, windpipe
...health and nutrition		dietary, nutrition, food groups, protein, fibre, carbohydrate, starches, minerals, protection, x-ray, hygiene, infection, bacteria, virus

Some animals have a **hydrostatic skeleton** – these are a fluid-filled compartment in the body called a coelom, mainly found in soft-bodied animals like jellyfish

This is a human **skeleton** – it is a type of **endoskeleton**

Key facts for this unit of learning

1. Living things need food to grow and to be strong and healthy
2. Plants can make their own food, but animals cannot
3. To stay healthy, humans need to exercise, eat a healthy diet and be hygienic
4. Animals, including humans, need food, water and air to stay alive

Humans need different types of **nutrition** stay healthy

Carbohydrates provide **energy**

Protein helps **growth and repair**

Fibre helps you **digest** the food you have eaten

Fats provide **energy**

Vitamins keep you **healthy**

Minerals keep you **healthy**

Water moves **nutrients** around the body and helps get rid of **waste**

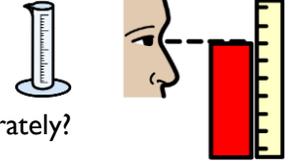


SUPER 6

- With support, and with the equipment provided, I can set up a simple fair test
- I can recognise what a fair test is with support
- I am beginning to use standard units of measurement when recording data
- I can use results to draw simple conclusions and report on these using speech and writing
- I can help make decisions about how to analyse data
- With support, I can improve my own data analysis

Red / Orange / Green

In this enquiry, you will make systematic and careful **observations** and measurements using standard units

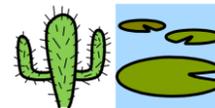


Why are accurate measurements important?
What would happen if we did not measure accurately?

Think about what you already know about plants
What do they need to grow well and **survive**?



Even though plants need water to grow well, it is possible for them to have too much water!
If a plant is **under watered**, the leaves may droop and feel dry
If a plant is **overwatered**, the leaves may turn yellow and brown



Different plants need different amounts of water
Some plants need very little water
Some plants need lots of water

You will need to carefully measure the amount of water you give the plants
You might use jugs, measuring cylinders and pipettes



There are 1000 (one thousand) **millilitres** in 1 (one) **litre**

I can start using specialist vocabulary and scientific terms

root		Plants have roots to anchor them in soil; roots also absorb water and nutrients from soil
measuring cylinder		Measuring cylinders are used to measure out amounts of water (or other liquids)
analyse		Examine something in detail to explain and understand it
litre millilitre		Litres and millilitres are used to measure amounts of liquid; 1000 (one thousand) millilitres is equal to 1 (one) litre
fair test		A fair test is when all variables are controlled except the one being tested; this helps the scientists conducting the test to know exactly what has affected the results

Other words or phrases I may use for talking about...

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...equipment		apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass
...plants		absorb, fertiliser, transported, pollination, seed formation, carpel, stigma, style, ovary, ovule, stamen, anther, filament, sepal, pollen names of locally-found and school relevant plants, trees and vegetables



Red / Orange / Green

SUPER 6

- I can identify and describe the functions of different parts of flowering plants, including roots, stems/trunks, leaves and flowers
- I can describe how the requirements of plants for life and growth can vary from plant to plant
- I can investigate the way in which water is transported within plants
- I can explain the role that flowers play in the lifecycle of flowering plants, including pollination, seed formation and seed dispersal
- I can suggest what observations to make
- I can ask questions and use my observations to answer them

I can start using specialist vocabulary and scientific terms

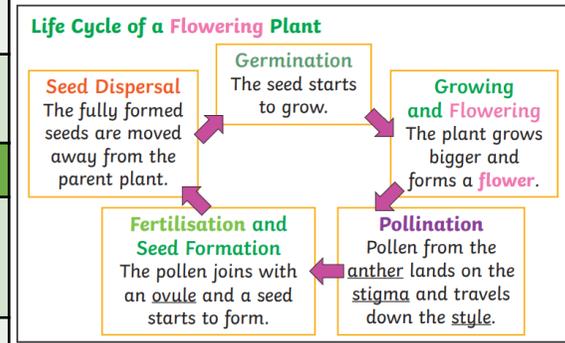
flowers		These make seeds to grow into new plants; their petals attract pollinators to the plants
pollination		When pollen is moved from the male anther of a flower to the female stigma
pollinator		Animals which carry pollen between plants; examples include bats, insects and birds
seed dispersal		A method of moving the seeds away from the parent plant so the seeds have the best chance of survival
fertilisation		When the male and female parts of the flower are mixed so new seeds can be created

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...equipment		apparatus, hand lens, hour-glass, microscope, measuring cylinder, test-tube, cork stopper, petri dish, gauze, protractor, compass
...plants		absorb, fertiliser, transported, pollination, seed formation, carpel, stigma, style, ovary, ovule, stamen, anther, filament, sepal, pollen names of locally-found and school relevant plants, trees and vegetables

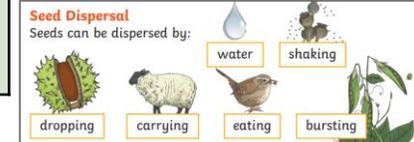
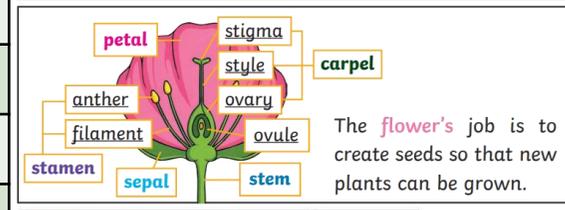
What Does a Plant Need to Grow?

Different plants vary in how much of these things they need. For example, cacti can survive in areas with little water, whereas water lilies need to live in water.



In this unit, you will learn about the purposes of different parts of plants and how plants **reproduce**

Try to remember your prior learning about plants – what do they need to survive and grow well?



How Water Moves through a Plant

- The **roots** absorb water from the soil.
- The **stem** transports water to the **leaves**.
- Water **evaporates** from the **leaves**.
- This **evaporation** causes more water to be sucked up the **stem**.

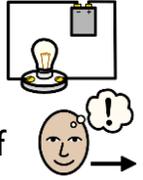


SUPER 6

- I can use my results to make predictions for my next set of results
- I can suggest improvements to a test and further questions to ask
- I can construct a simple circuit and name its parts
- I can say if a lamp in a circuit will light up or not and explain why
- I can explain the role of a switch in a circuit
- I can recognise common conductors and insulators

Red / Orange / Green
Red / Orange / Green

In this unit, you will learn about electricity and how it is made. You will make simple **circuits** and use your knowledge to help you **predict** if a bulb (or other component) will work



I can use specialist vocabulary and scientific terms

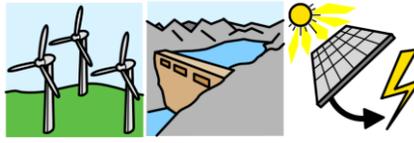
battery		A device that stores electrical energy as a chemical
circuit		A pathway that electricity can flow around; circuits can include different components, such as buzzers and bulbs
conductor		A material that allows electricity to flow through it; copper is a conductor and is often used to make wires
insulator		A material that does not allow electricity to flow through it; plastic is an insulator and so can be used to coat copper wires
switch		A circuit component that can be used to control whether electricity can flow through a circuit

Lightning and static electricity are examples of electricity occurring naturally, but for us to use electricity to power appliances, we need to make it

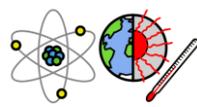


Coal, oil and natural gases are **fossil fuels** which, when burnt, produce heat which can be used to generate electricity

Electricity can be **generated** from wind power used to turn windmills and hydroelectric power from water used in dams. The Sun's rays can be converted into electricity by solar panels



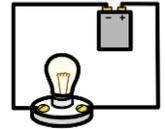
Nuclear energy is created when atoms are split; this creates heat which can be used to generate electricity. Geothermal energy is heat from the Earth that is converted into electricity



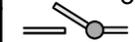
Other words or phrases I may use for talking about...

...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
...forces		electrical device, appliances, circuit, components, conductor, resistor, symbol, cell, battery, wire, bulb, switch, buzzer, motor, connection, complete circuit, closed circuit, open circuit, positive, negative, crocodile clip, alligator clip

Electricity can only flow around a complete **circuit** that has no gaps; there must be wires connected to both the positive and negative end of the power supply/**battery**



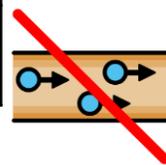
Switches can be used to open or close a circuit. When off, a switch 'breaks' the circuit to stop the flow of electricity; when on, a switch 'completes' the circuit and allows the electricity to flow



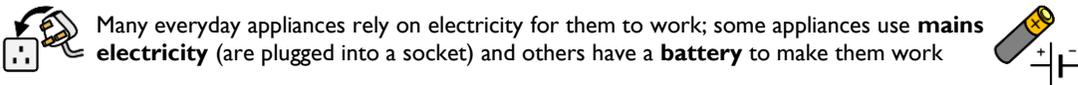
A **conductor** of electricity is a material that will allow electricity to flow through it; metals are good conductors



Materials that are electrical **insulators** do not allow electricity to flow through them; wood, plastic and glass are good insulators



Many everyday appliances rely on electricity for them to work; some appliances use **mains electricity** (are plugged into a socket) and others have a **battery** to make them work





SUPER 6

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

Red / Orange / Green

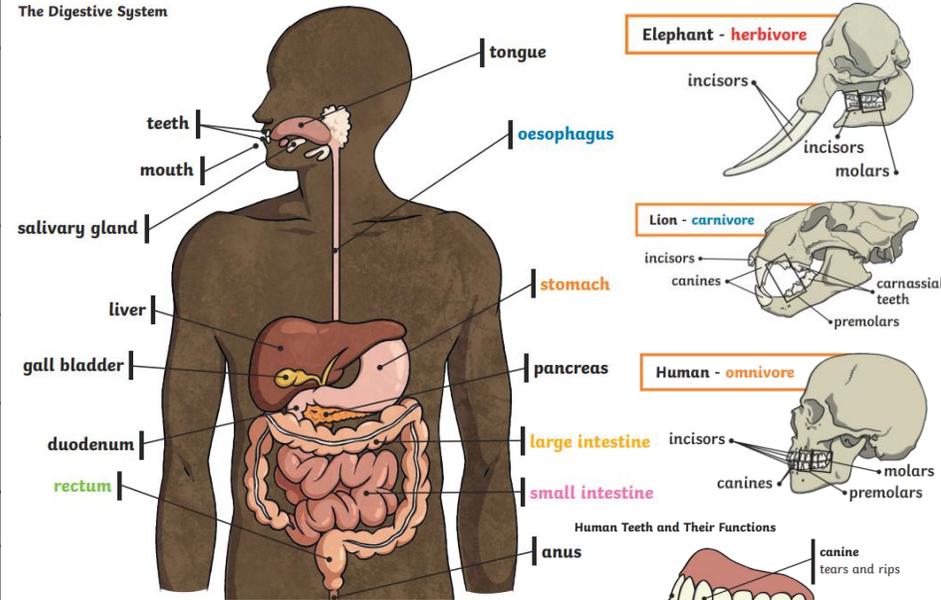
I can use specialist vocabulary and scientific terms

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

The Digestive System



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

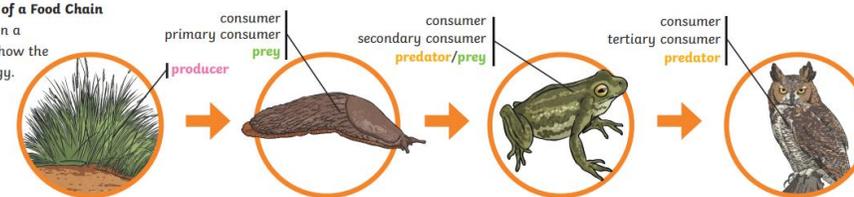


You can look after your teeth by visiting the dentist regularly, limiting the amount of sugary foods and drinks you have, and brushing your teeth twice a day.



An Example of a Food Chain

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





SUPER 6

- I can make careful and systematic observations using a range of equipment
- I can use my observations identify differences, similarities and changes related to simple scientific ideas and processes
- I can compare and group materials together according to whether they are solids, liquids or gases
- I can observe that some materials change state when they are heated or cooled
- I can research or measure the temperature at which some changes of state happen
- I can identify the parts played by evaporation and condensation in the water cycle and link this to temperature

Red / Orange / Green

I can use specialist vocabulary and scientific terms

solid		Solids keep their shape unless a force is applied; they always take up the same amount of space
liquid		Liquids take the shape of the container they are in; they change shape, but do not change the amount of space they take up; they can flow or be poured
gas		Gases can spread out (diffuse) to fill a room or container; they do not have a fixed shape, but they do have mass
water cycle		The series of processes where the world's water circulates between oceans, atmosphere, and land
precipitation		The collective term for rain, snow, sleet, hail, and any other way water gets from the sky to the ground

There are four **natural states of matter**: **solids, liquids, gases** and **plasma**
There are also **man-made** states of matter, such as **time crystals** and **Bose-Einstein condensates**
You will learn about **solids, liquids** and **gases** in this unit of learning

Particles in a **solid** are close together and cannot move; they can only vibrate

Particles in a **liquid** are close together but can move around each other easily

Particles in a **gas** are spread out and can move around very quickly in all directions

When water and other liquids reach a certain temperature, they change **state** into a solid or a gas
These changes can work the other way as well (so a solid can change into a liquid)
The temperatures that these changes happen at are called the **boiling, melting** or **freezing points**
Each material (or substance, or chemical) will have its own boiling, melting and freezing point

If a **solid** is heated to its **melting point**, it melts and changes into a **liquid**; this is because the particles start to move faster and faster until they are able to move over and around each other

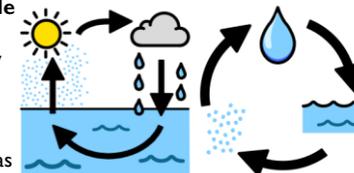
If a **liquid** is cooled enough, **freezing** will occur; the particles in the liquid will slow down as they get colder, and they will only be able to move gently on the spot which gives then a **solid** structure

Evaporation occurs when a **liquid** turns into a **gas**; this can happen quickly (such as when water is boiled in a kettle) or slowly (such as when a puddle evaporates in warm air)

Condensation is when a **gas** is cooled down and turns into a **liquid**; you can see condensation when water droplets form on a window – the water vapour in the air cools when it touches the cold surface

Condensation and evaporation occur during the **water cycle**

1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into water vapour
2. This water vapour rises, then cools down to form water droplets in clouds (**condensation**)
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail, or snow (**precipitation**)



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
...materials		manufactured, oxygen, change of state, solidify, gaseous, water vapour, water cycle, precipitation, evaporation, condensation, degree, Celsius, waste, sewage

Did you know?

Because of the **water cycle**, the water you drink could have also been drunk by a dinosaur!





SUPER 6

- I can report my results using detailed written or oral explanations
- I know that living things can be grouped in a variety of ways
- I can explore and use classification keys to name living things in the local, and wider, environment
- I recognise that environments can change and the dangers this can pose to living things
- I can identify and sort animals into mammals, amphibians, insects and birds
- I can explain how some animals have adapted to their environments

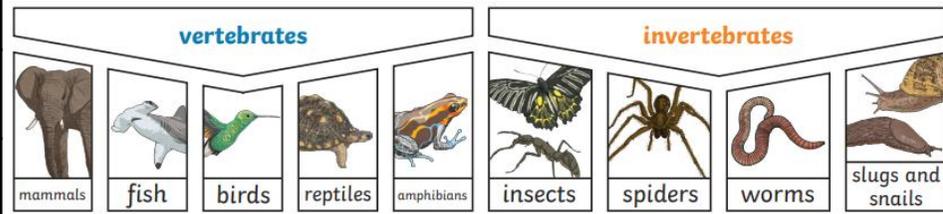
Red / Orange / Green

In this unit of learning, you will learn how to sort animals using their **characteristics**



I can use specialist vocabulary and scientific terms

classification		Where living organisms are sorted into groups based on their common features and similarities
characteristic		The distinguishing features or qualities that are unique to a species
environment		An environment contains many habitats, and these include areas with both living and non-living things
adapt		Become adjusted to new conditions; when animals change to be able to survive better
extinct		When a species has no more members alive, it is extinct

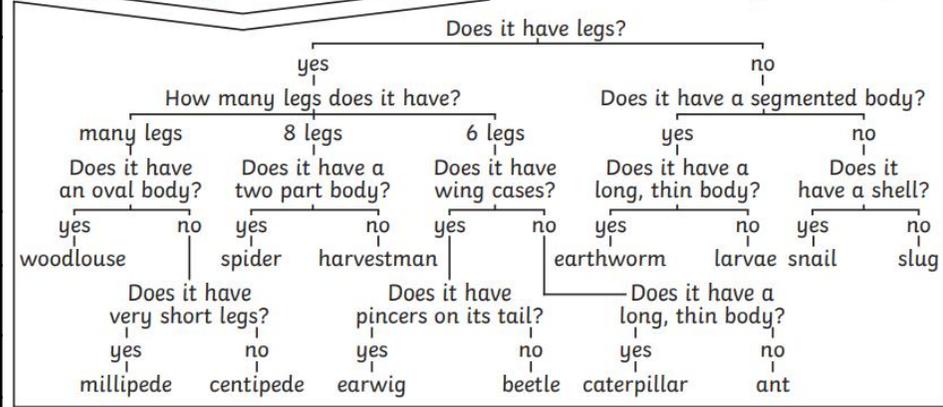


Vertebrates can be separated into five broad groups.

You can use **classification** keys to help group, identify and name a variety of living things. Here is an example of a **classification** key:

You could sort **invertebrates** you might see around school in different ways, such as in this example. The vast majority of living things on the planet are **invertebrates**.

Invertebrate Classification Key



Changes to an **environment** can be natural or caused by humans. Changes to an **environment** can have positive as well as negative effects. Here are some examples of things that can change an **environment**.

Natural	<ul style="list-style-type: none"> • earthquakes • storms • floods • droughts • wildfires • the seasons 	Human-Made	<ul style="list-style-type: none"> • deforestation • pollution • urbanisation • the introduction of new animal or plant species to an environment • creating new nature reserves
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Plants and animals rely on the **environment** to give them everything they need. Therefore, when **habitats** change, it can be very dangerous to the plants and animals that live there.

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
...habitats		classification, key, (in)vertebrates, mould, fungus, organism, population, deforestation, pollution, positive/negative human impact, variation, biome, vegetation, region, dominant, environmental, anemometer, barometer



All living things have seven characteristics ; these are called **life processes**
Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition



SUPER 6

- I can set up my own practical enquiries, comparative tests, and fair tests
- I can use different types of scientific enquiries and evidence to support my findings
- I can use my data to help me think of new questions to ask
- I can suggest what observations to make, how long to make them for, and what equipment to use to make them
- I can make decisions about how to record data
- I can record data using standard units of measurements

Red / Orange / Green

I can use specialist vocabulary and scientific terms

data logger		A data logger is a piece of equipment that can be used to take accurate measurements and record (log) them; they can be used to record sound, temperature, light levels, and other things
thermometer		A thermometer is used to check the temperatures of a substance
comparative test		A comparative test is where you test and compare different things; it is less formal than fair testing
degrees Celsius		The Celsius scale of temperature is a way of comparing temperature; water freezes at 0° C (say zero degrees Celsius) and boils at 100° C
accurate		Correct in all details, exact; good scientists must take accurate measurements

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
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...equipment		aquarium, Pasteur, pipette, forceps
...materials		manufactured, oxygen, change of state, solidify, gaseous, water vapour, water cycle, precipitation, evaporation, condensation, degree, Celsius, waste, sewage



Could you tell the temperature of water just by putting your hand in it?
How **accurate** do you think this would be?



We can use a piece of equipment called a **thermometer** to measure the temperature of different substances, including water
You might have used a thermometer to take your temperature when you are sick



Data loggers are pieces of equipment that can be used to take and record a range of different measurements; you can attach a **temperature probe** to a data logger to find the temperature of things

You might use the measurements from a data logger to create a **line graph** to see how temperature changes over time



What do you think are the advantages of using a thermometer?



What are the disadvantages?

What are the advantages of using a data logger?



What are the disadvantages?

How can you ensure that your results are as **accurate** as possible?



Did you know? One of the most common units used to measure temperature is degrees Celsius (°C); you may see this used on weather reports or oven settings



SUPER 6

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

Red / Orange / Green
Red / Orange / Green

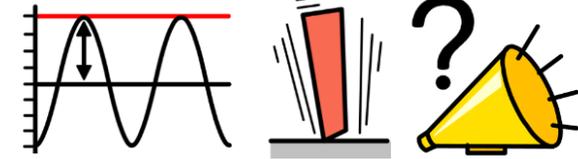
Sound is a type of energy; it is caused by **vibrations**.
The bigger the **vibration**, the louder the sound!



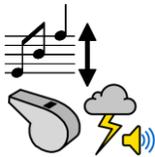
I can use specialist vocabulary and scientific terms

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

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



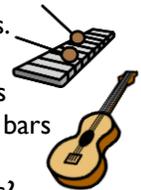
Pitch is a measure of how **high** or **low** a sound is. A whistle creates a **high-pitched** sound; a rumble of thunder is an example of a **low-pitched** sound.



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?

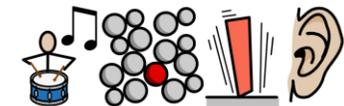
Other words or phrases I may use for talking about...

...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

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.



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!



Red / Orange / Green

SUPER 6

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

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.



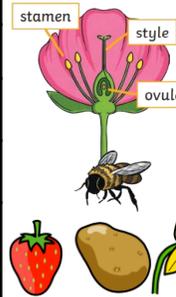
Birds are hatched from eggs and are looked after by their parents until they can live independently.



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.





SUPER 6

- I can use my test results to make more accurate predictions
- I can explain my predictions with reasoning
- I can set up further comparative and fair tests based on my previous test results
- 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
- I know that some materials with dissolve in a liquid to form a solution, and know how to recover a substance from a solution
- I can use my knowledge of states of matter to decide how mixtures might be separated through filtering, sieving and evaporating

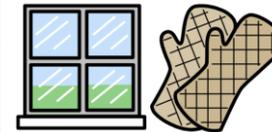
Red / Orange / Green

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 made when solid particles are mixed with a liquid and the particles do not dissolve (like sand and water)

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?



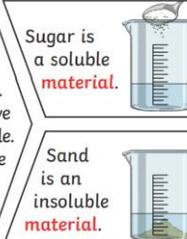
Some materials can change their state from solid, to liquid and gas, and vice versa. Some of these changes are **reversible** and some are **irreversible**.



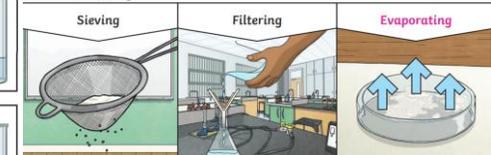
Other words or phrases I may use for talking about...

...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

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?





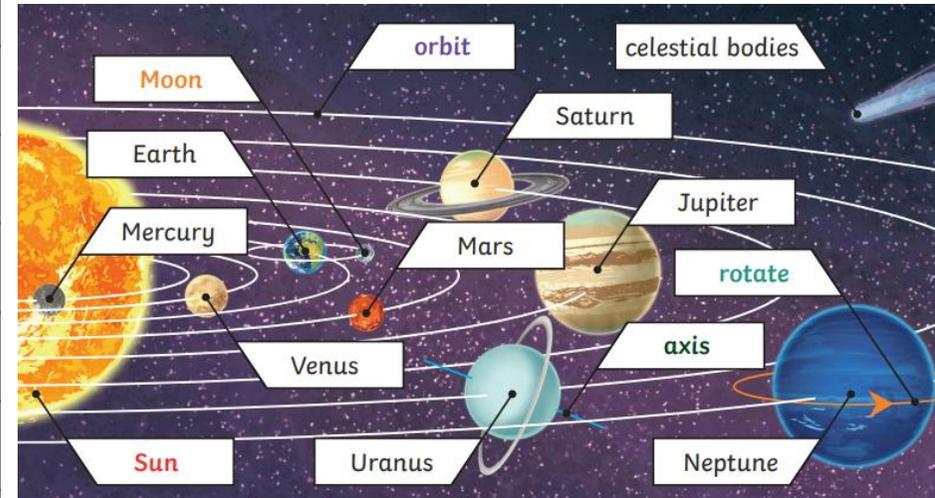
SUPER 6

- I can examine familiar modelled options of recorded data and analyse these
- I can report and present my findings and discuss conclusions and causal relationships orally and in writing
- I can describe the movements of the Earth, and other planets, relative to the Sun
- I can describe the movement of the Moon relative to the Earth
- I can describe the shapes of the Earth, Sun and Moon
- I can use the Earth's movement to explain why we have night and day, and why the Sun appears to move in the sky

Red / Orange / Green

I can use specialist vocabulary and scientific terms in appropriate ways

star		A giant ball of burning gas held together by its own gravity; the Sun is one of many stars in our galaxy
orbit		To move in a curved, regular pattern around another object; the Earth orbits the Sun
rotate		To spin around; the Earth rotates on its own axis
heliocentric model		The structure of the solar system where planets orbit around the Sun
planet		A large, (usually) round object that orbits a star; some are made of mostly rock, others might be mostly gas
satellite		Any object that orbits another object; the Moon is a satellite of Earth; humans have launched many satellites



Mercury, Venus, Earth and Mars are rocky planets; they are mostly made of rock and metals

Jupiter, Saturn, Uranus and Neptune are gas giants; they are mostly made of gases (like helium and hydrogen); some scientists think they may have solid cores beneath the gases

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
...sound, light, Earth and space		axis, axes, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, celestial body, spin, sphere, spherical, rotation, elliptical orbit, revolve, asteroid, meteor(ite), comet, galaxy, light year, latitude, longitude, equator, hemisphere, prime/Greenwich meridian, time zone

Geocentric model
Years ago people believed that **planets** moved around the Earth.

It appears to us that the **Sun** moves across the sky during the day but the **Sun** does not move at all. It seems to us that the **Sun** moves because of the movements of Earth.

The work and ideas of many **astronomers** (such as Copernicus and Kepler) combined over many years before the idea of the **heliocentric model** was developed. Galileo's work on gravity allowed **astronomers** to understand how **planets** stayed in orbit.

Nicolaus Copernicus

It appears to us that the **Sun** moves across the sky during the day but the **Sun** does not move at all. It seems to us that the **Sun** moves because of the movements of Earth.

Earth **rotates** (spins) on its axis. It does a full **rotation** once in every 24 hours. At the same time that Earth is **rotating**, it is also **orbiting** (revolving) around the **Sun**. It takes a little more than 365 days to **orbit** the **Sun**. Daytime occurs when the side of Earth is facing towards the **Sun**. Night occurs when the side of Earth is facing away from the **Sun**.





SUPER 6

- I can choose my own equipment to use
- I can recognise variables and, with support, decide how to control these variables
- I can take measurements using a wide range of scientific equipment with accuracy and precision
- I can explain how gravity causes objects to fall towards the Earth
- I can identify the effects of air resistance, water resistance, and friction that act between moving surfaces
- I can recognise that some mechanisms allow a smaller force to have a greater effect

Red / Orange / Green

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.



Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

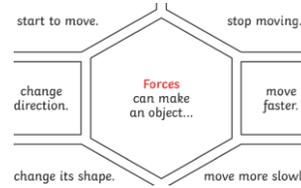


Isaac Newton is famously thought to have developed his theory of **gravity** when he saw an apple fall to the ground from an apple tree.



I can use specialist vocabulary and scientific terms in appropriate ways

gravity		A pulling force that is exerted by anything that has mass; the Earth is large, so we are pulled towards it
mass		The measure of how much 'stuff' (or matter) is inside an object
weight		The measure of the force of gravity on an object; your mass would not change if you went to the moon, but your weight would as there is less gravity there
upthrust		A force that pushes objects up, usually in water
streamlined		When an object is shaped in a way to minimise air or water resistance
air resistance		A type of friction caused by air pushing against a moving object



Mass is how much matter is inside an object. It is measured in kilograms (kg).

Weight is how strongly gravity is pulling an object down. It is measured in newtons (N).

swimmer's **force** water **resistance** gravity cyclist's **driving force** friction

Water resistance and air resistance are forms of friction. Friction is sometimes helpful and sometimes unhelpful. For example, air resistance is helpful as it stops the skydiver hitting the ground at high speed. Friction on a bike chain can make the bike harder to pedal so it is unhelpful.

It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

This shark is streamlined.

It does not create much water resistance so it can move through the water quickly.

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
...forces		mechanisms, air resistance, water resistance, levers, pulleys, gears, cams, drag forces, transference

Pulleys	Gears/Cogs	Levers
Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight .	Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.	Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.



Red / Orange / Green

SUPER 6

- I can plan my own different types of scientific tests
- I can explain my predictions with reasoning
- I can choose my own equipment to use
- I can recognise variables and, with support, decide how to control these variables
- I can make my own decisions about what observations and measurements to take, and what equipment I will use
- I can set up further comparative and fair tests based on my previous results

I can use specialist vocabulary and scientific terms in appropriate ways

absorb		To take in something in a natural and gradual way
predict		To describe what you think will happen and give reasons to justify your thinking
comparative test		A comparative test is where you test and compare different things; it is less formal than fair testing
fair test		A fair test is when all variables are controlled except the one being tested; this helps the scientists conducting the test to know exactly what has affected the results
quantitative observation		When the thing you are observing can be measured or counted, you are making a quantitative observation
nappy		An item of clothing that includes an absorbent material that is used to absorb and retain urine and faeces; some nappies can only be used once, others can be washed and used again and again

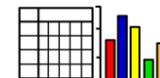
Can you carry out a **fair test** to compare the **absorbency** of different brands of nappy?
Can you explain why your test is (or is not) fair?

Think about your prior learning about **materials**
Which materials can **absorb** (soak up) water and other liquids?
Which ones are waterproof?
What properties do you want in a material that is being used in a nappy?

You will need to consider these key questions when planning your experiment:

- What are you trying to find out? What are you comparing?
- What will you do? What will you measure?
- What will you keep the same? What will you change?
- How will you record your results?
- How will you **verify** your results? (make sure they are **accurate**)
- How will you know if you have conducted a good test/obtained reliable results?

Repeating your readings will allow you to check how reliable and accurate they are



You might record your results in a table or bar chart to make analysis easier

Other words or phrases I may use for talking about...

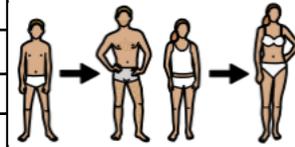
...working scientifically		percentage, distribution, causal, correlate, dependent, variable, control, cancel out, imperial units, maximum, minimum, million, diagonal, reflex angle, rotation, sparse, abundant, capacity, phenomenon, exceptional, crucial, complex, sustain, perspective, rigorous
...skills		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



SUPER 6

- I can describe the changes as humans develop to old age
- I can describe the simple functions of basic parts of the digestive system in other animals (not humans)
- I can describe the changes in a variety of animals as they develop to old age
- I can recognise the impact of diet and exercise on the way our bodies function
- I can plan my own different types of scientific tests
- I can explain my predictions with reasoning

Red / Orange / Green
Red / Orange / Green



Puberty is the time when a **child's** body changes into that of an **adult**

I can use specialist vocabulary and scientific terms in appropriate ways

life cycle		The changes that a living thing goes through over the course of its life, including reproduction
child		A young human who has not yet started puberty
puberty		The physical stage of development in a human life cycle between childhood and adulthood
adolescence		The social and emotional stage of development in a human life cycle between childhood and adulthood
adult		A stage of human development where a person is fully grown and mature
exercise		Activity that requires physical effort and is designed to improve health and fitness

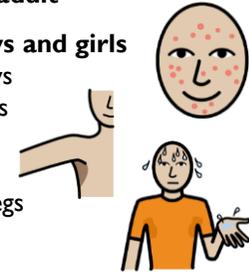


Other words or phrases I may use for talking about...

...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
...animals, including humans		Fertilisation, birth, uterus, embryo, ovary, placenta, chromosomes, ovum, zygote, fallopian tubes, gestation, infancy, arachnid, mollusc, crustacean, sponge
...health and nutrition		Puberty, menstrual cycle, penis, testes, vagina, pubic hair, hormones

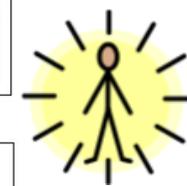
Changes for both boys and girls

- Larynx (voice box) grows
- Grow hair under armpits
- Grow pubic hair
- Skin becomes oilier
- Gain hair on arms and legs
- Grow taller
- Sweat more



Changes for girls only

- Grow breasts
- Start to menstruate



Changes for boys only

- Grow hair on chest
- Scrotum, testes and penis develop
- Become more muscular



Humans can make different choices to ensure they stay well and healthy their whole lives; these include decisions about diet and exercise



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

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

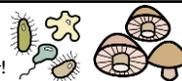
I can use specialist vocabulary and scientific terms in sophisticated ways

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...

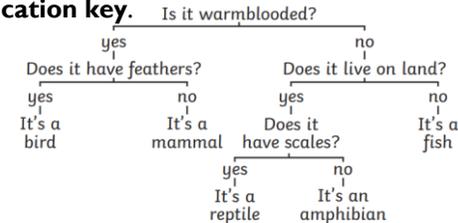
...working scientifically		recurring, proportion, ratio, radius, diameter, circumference, concentric, arc, intersecting, plane, cross-section, appropriate accuracy, degree of trust, robust, authentic, plausible, controversy, stance, bias, tertiary source
...skills		determine, attribute, analyse, corroborate, 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



Red / Orange / Green

SUPER 6

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

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

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.

from body → to body
from body → to lungs
from lungs →

deoxygenated blood → ← oxygenated blood

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.

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

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!

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.

- 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.





SUPER 6

- I can talk about how scientific ideas have developed over time
- I can identify and use scientific evidence to support or refute ideas and arguments
- I can begin to separate opinion from fact when using secondary sources
- I can recognise that living things have changed over the time and how fossils help us understand this
- I know that offspring may not be identical to their parents
- I can describe how plants and animals have adapted to their environments and how this can lead to evolution

Red / Orange / Green
Red / Orange / Green



There are many different **habitats** in the world; a good habitat provides shelter, space to move and grow, and plenty of food



There are many different **environments** or **biomes** around the world; examples include polar regions, tropical islands, rainforests, oceans, rivers, grasslands, etc.



Fossils are the preserved remains, or partial remains, of ancient plants and animals; they let us know how plants and animals used to look millions of years ago and are proof that **evolution** has taken place

I can use specialist vocabulary and scientific terms in sophisticated ways

inheritance		This can be something you receive from a relative after they die; in scientific terms, it is when characteristics are passed from parents to offspring
variation		The differences between individuals in a species
adaptation		A trait or characteristic that increases an organism's chance of survival in a particular environment
evolution		Adaptation over a very long time; evolution can lead to new species being created
natural selection		The process where organisms that are better adapted to their environments tend to survive and produce more offspring
fossil		The remains, or imprint of, a prehistoric plant or animal that have been preserved

Offspring
Animals and plants produce **offspring** that are similar but not identical to them. **Offspring** often look like their parents because features are passed on.

Variation
In the same way that there is **variation** between parents and their **offspring**, you can see **variation** within any species, even plants.

Adaptive Traits
Characteristics that are influenced by the **environment** the living things live in. These **adaptations** can develop as a result of many things, such as food and climate.

Inherited Traits
Eye colour is an example of an **inherited trait**, but so are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

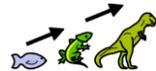
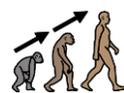
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...skills		determine, attribute, analyse, corroborate, discern, epitomise, characterise, extrapolate
...presentation		pie charts, mean, four quadrants
...evolution and inheritance		(micro)organism, species, microbes, evolution, evolutionary change, natural selection, adaptation, competition, genes, dominant, recessive, DNA, chromosomes, inherit(ance), survival of the fittest, fossil record

Organisms (living things) have **adapted** (or changed) to enable them to have a greater chance of survival in the environment they inhabit. Organisms that survive are more likely to **reproduce** and have **offspring**.

Living Things	Habitat	Adaptive Traits
polar bear	arctic	Its white fur enables it to camouflage in the snow.
camel	desert	It has wide feet to make it easier to walk in the sand.
cactus	desert	It stores water in its stem.
toucan	rainforest	Its narrow tongue allows it to eat small fruit and insects.

Evolution is the gradual (very slow) process where different kinds of living things have developed (or **evolved**) from earlier life forms over millions of years; scientists have proof that life is continuously **evolving** even today!



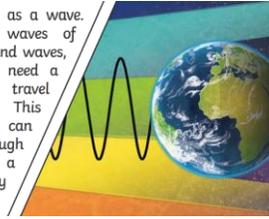


SUPER 6

- I can make my own decisions about what observations and measurements to take
- I can choose the most appropriate equipment and explain why I have chosen it
- I can present my findings in a variety of ways
- I can describe how light travels
- I can explain how the way light travels helps us see objects
- I can explain why shadows have the shapes that they do

Red / Orange / Green
Red / Orange / Green

Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means light can travel through a vacuum - a completely airless space.

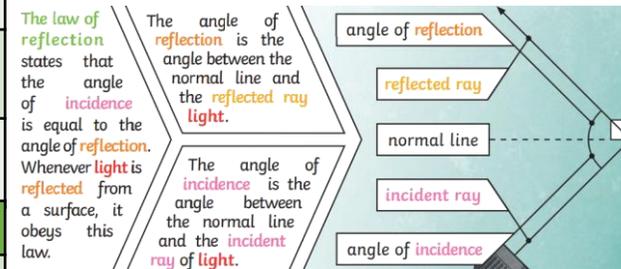
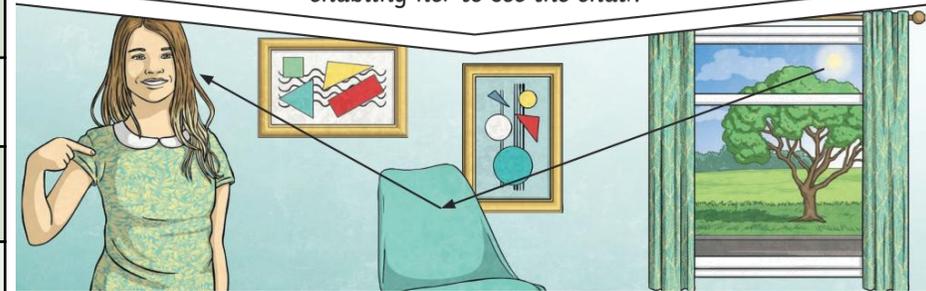


We need light to be able to see things; **light waves** travel out from **light sources** in straight lines; these lines are often called **rays** or **beams**

I can use specialist vocabulary and scientific terms in sophisticated ways

reflection		Reflection is when light bounces off a surface, changing the direction of a ray of light
refraction		This is when light 'bends' as it moves from one medium to another, an example is when light enters water; this happens as light travels at different speeds in different media
prism		A prism is a solid 3D shape with flat sides; the two ends are an equal shape and size; transparent prisms can separate visible light into the colours of the spectrum
visible spectrum		Light that can be seen by human eyes; it is made up of a spectrum of colours
translucent		Objects that let some light through, but a lot of the light is scattered so we cannot completely see through
opaque		No light is let though opaque objects

Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.



The spoon in this water looks as if it is bent. This is because **light** bends when it moves from air to water. When **light** bends in this way, it is called **refraction**.

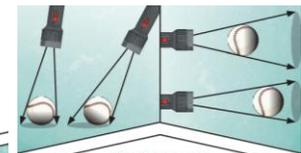
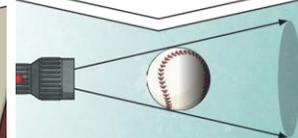
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...skills		determine, attribute, analyse, corroborate, discern, epitomise, characterise, extrapolate
...presentation		pie charts, mean, four quadrants
...sound, light, Earth and space		transmission, optics, refraction, geocentric, heliocentric, universe

Isaac Newton shone a **light** through a transparent **prism**, separating out **light** into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible **light**.



A **shadow** is always the same shape as the object that casts it. This is because when an **opaque** object is in the path of **light** travelling from a **light source**, it will block the **light** rays that hit it, while the rest of the **light** can continue travelling.



Shadows can also be elongated or shortened depending on the angle of the **light source**. A **shadow** is also larger when the object is closer to the **light source**. This is because it blocks more of the **light**.



Red / Orange / Green

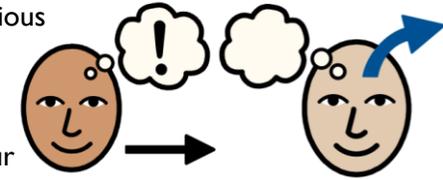
SUPER 6

- I can plan scientific enquires where I have to recognise and control variables
- I can use my results to create a more accurate follow-up experiment to test my predictions
- I can recognise variables, decide how to control them, and explain why they need controlling
- I can decide if I need to repeat my measurements and explain why
- I can report and present my findings from enquiries including conclusions, causal relationships and the degree of trust in the results
- I can use relevant scientific language and illustrations to discuss, communicate and justify my ideas

I can use specialist vocabulary and scientific terms in sophisticated ways

conclusion		Where you describe what you found out; you might summarise your results and explain if your hypothesis was proved or disproved
hypothesis		A hypothesis is a statement about a specific question and describes what you expect to find out
results		Results are what has happened in the experiment; they may include data and observations; results can be easier to understand if they are presented in chart or graph form
pulse		A rhythmical throbbing of the arteries as blood flows through them; you can usually feel a person's pulse on their wrist or neck
oxygen		A gas in the air; humans need to breathe oxygen to survive; about 21% of Earth's atmosphere is oxygen
heart		An organ in the body that is constantly pumping so that blood moves around the body

You will need to make and explain your predictions based on previous results and prior learning



You will need to carry out a scientific enquiry to answer your question

You know that the **pulse** can be hard to measure but generally increases after **exercise**



Can still poses raise our heart rate?

You will need to plan and carry out a test into a stationary exercise
You need to consider:

How long the pose should last
Comparison with resting pulse rate



Whether one child or several children should be tested

How to carry out the tests safely



How to ensure your results are accurate

Questions to support you

After your last pulse rate investigations, what do you predict this time?

What is the difference between resting rate before and after the stationary exercise?

Can you see any visible changes caused by blood circulation when a person does a head stand, etc.?

Why do you think the heart beats faster when you are upside down?

Do your results support or not support your prediction? Why?

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

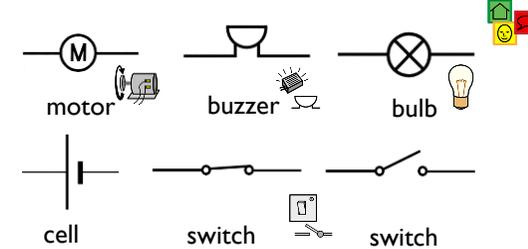


SUPER 6

- I can use my test results and reasoning skills together to make accurate predictions
- I can present my findings in a variety of ways
- I can decide if I need to repeat my measurements and explain why
- I can explain how to change the brightness of a lamp in a circuit
- I can explain variations in how circuit components function
- I can use the correct symbols when drawing circuit diagrams

Red / Orange / Green

Common symbols for circuit diagrams



I can use specialist vocabulary and scientific terms in sophisticated ways

cell battery		A device that stores chemical energy until it is needed; a cell is a single unit, and a battery is a collection of cells
voltage		The force that makes the electric current move through the wires; the greater the voltage, the more current will flow
current		Electrons flow through the wires – this is current; current is measured in units called amps; the higher the current, the more electrons are flowing
motor		A motor turns electrical energy into kinetic energy; the motors we use in school usually have a magnet wrapped in a coil of wire that spins when electricity flows through the wires
buzzer		A buzzer uses electricity to make a vibration, which creates a sound we can hear
symbol		A visual picture that stands for, or represents, something else

A **cell** is a single source of electrical energy, which produces a current using chemical energy; a **battery** is when you have two or more cells connected together



Circuit diagrams are useful because they show how a **circuit** is connected together in a way that everyone can understand



Scientists and engineers can use the diagrams to help them to re-build circuits designed by other people



An electrical engineer

An electrical **circuit** is a closed loop or path that electricity can flow through to make a component work



The **brightness** of a bulb is the amount of light it produces

To **affect** something or someone is to change it or how it behaves

A **variable** is something that can be changed, measured or kept the same in an investigation or experiment

When considering the **variables**, think about all the things that you could change; all of the things that you can change are the variables

I could change the number of cells.

I could change the positions of the components

I could add other components to the circuit

Is there anything else?

These children are investigating how to change the brightness of bulbs in a circuit – can you think of any other possible variables?

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
...forces		simple circuit, series circuit, parallel circuit, terminal, voltage, power, current, resistance, wire types, plain, nichrome, fuse, copper, florist's

IMPORTANT! Remember to only change **ONE** variable at a time, or you will not know which variable affected the results!