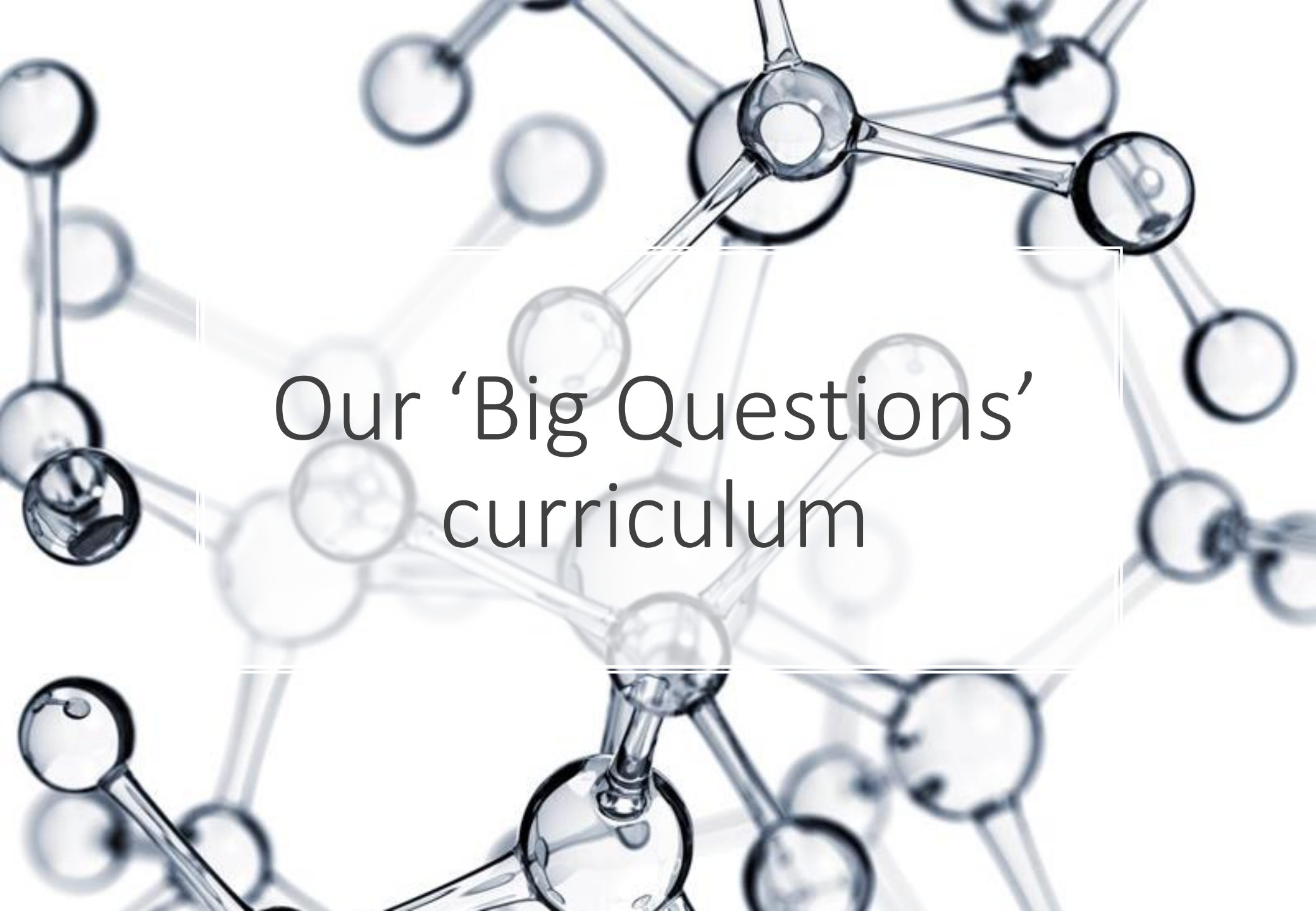




Our 'Big Questions' curriculum

Is form fixed?

What are things made from?

What natural objects link science with geography and history?

Chemistry

Physics

Biology

The Big Questions

Can we see and hear energy?

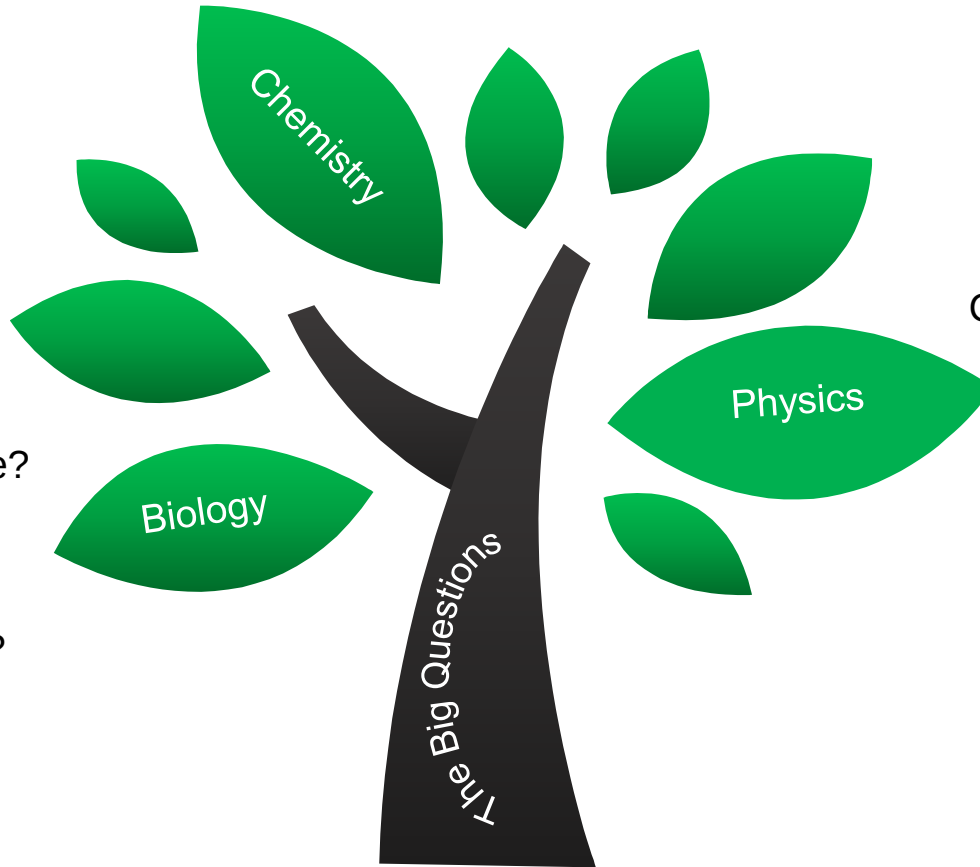
How do things move?

Can forces be useful?

What kinds of life are there?

How do living things work?

What makes life go on?



Biology- The big questions

What kinds of life are there?

1. What is alive? (Year 1)
2. Living things: what's the same and what's different? (Year 4)
3. Living things: what's the same and what's different? (Year 6)

How do living things work?

1. What are bodies and what can they do? (Year 1)
2. How can living things stay healthy? (Year 2)
3. How do living things work? (Year 3)
4. What do our bodies do with the food we eat? (Year 4)
5. How do our choices affect how our bodies work? (Year 6)

What makes life go on?

1. Does our world change or stay the same? (Year 1)
2. What is alive, dead or was never alive? (Year 2)
3. Do living things need different things to survive? (Year 3)
4. Do all life cycles look the same? (Year 5)
5. How do our bodies change as we get older? (Year 5)
6. How do living things change over time? (Year 6)

Chemistry- The big questions

What are things made from?

1. What are things made from? (Year 1)
2. How do we choose materials? (Year 2)
3. What are things made from and why? (Year 5)

Is form fixed?

1. Can we change materials? Part 1 (Year 2)
2. Is water always wet? (Year 4)
3. Can we change materials? Part 2 (Year 5)

What natural objects link science with history and geography?

1. Are all rocks the same? (Year 3)

Physics- The big questions

Can we see and hear energy?

1. What is the dark? (Year 3)
2. How do we hear different sounds? (Year 4)
3. How do we see? (Year 6)

How do things move?

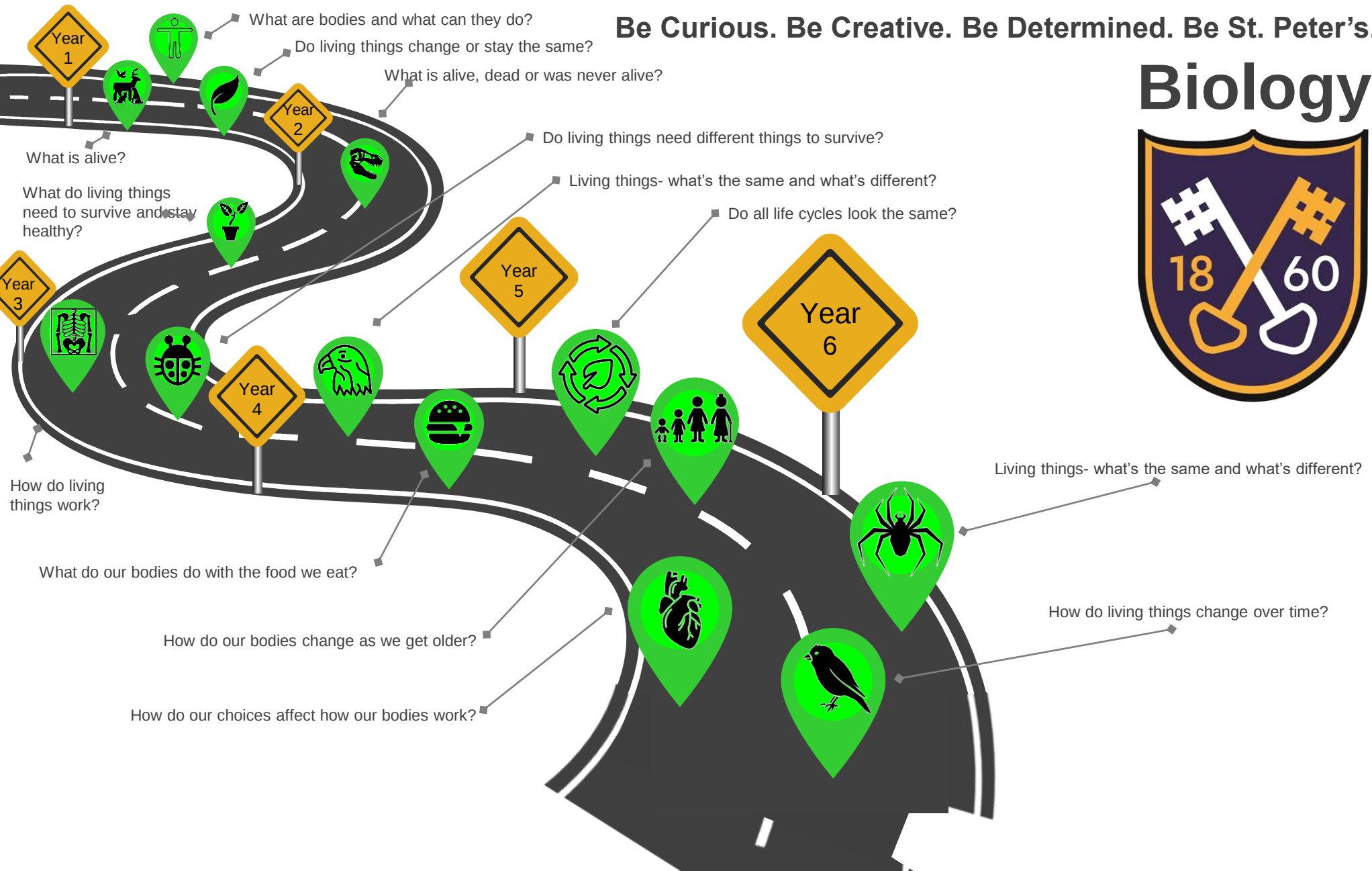
1. Sun, Earth and Moon: what's moving? (Year 5)
2. How do things move? (Year 5)

Can forces be useful?

1. What can magnets do? (Year 3)
2. Can we control electricity? (Year 4)
3. Can we vary the effects of electricity? (Year 6)

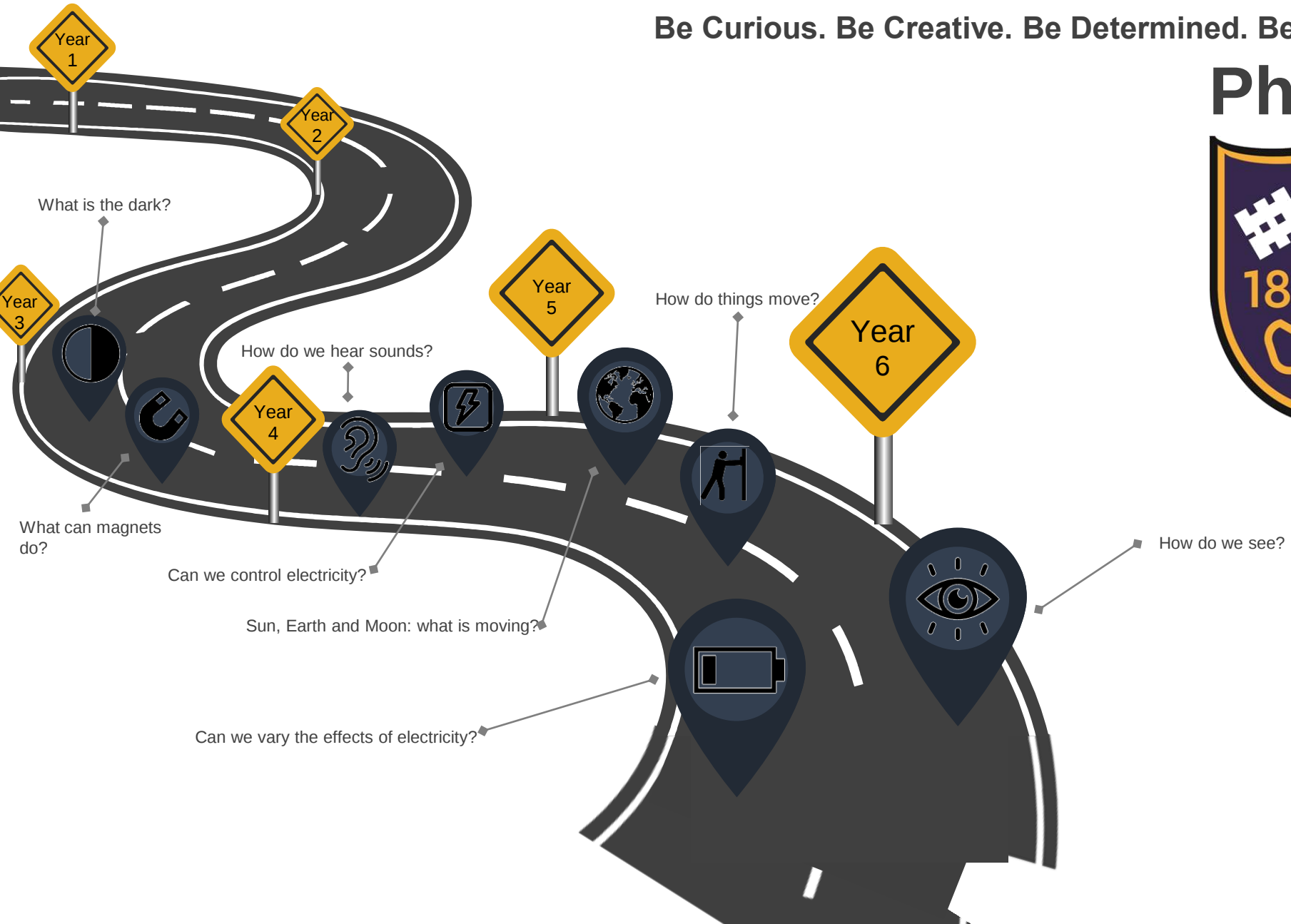
Be Curious. Be Creative. Be Determined. Be St. Peter's.

Biology



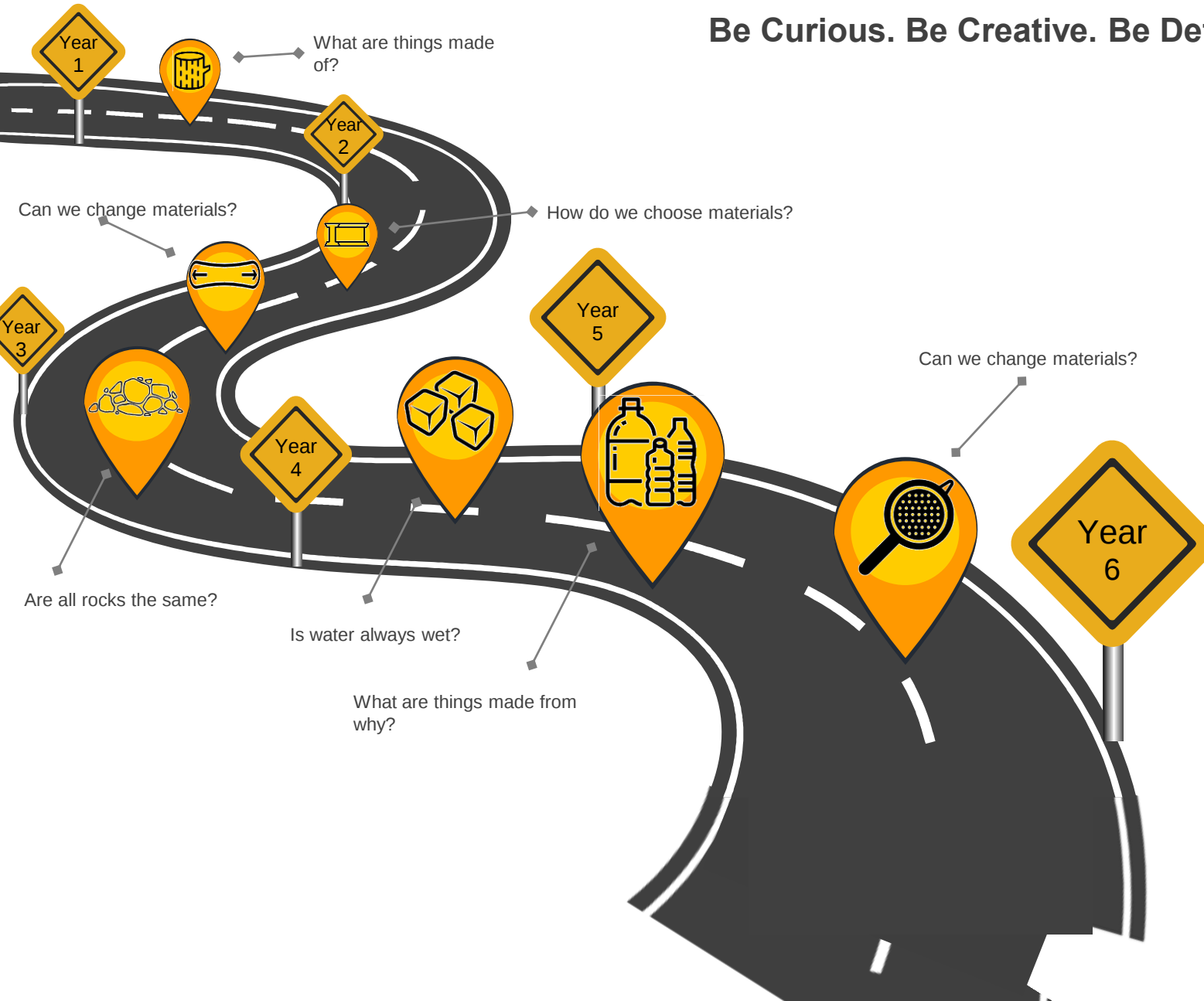
Be Curious. Be Creative. Be Determined. Be St. Peter's.

Physics



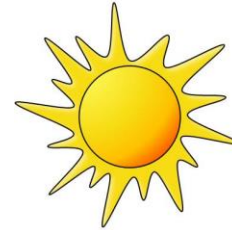
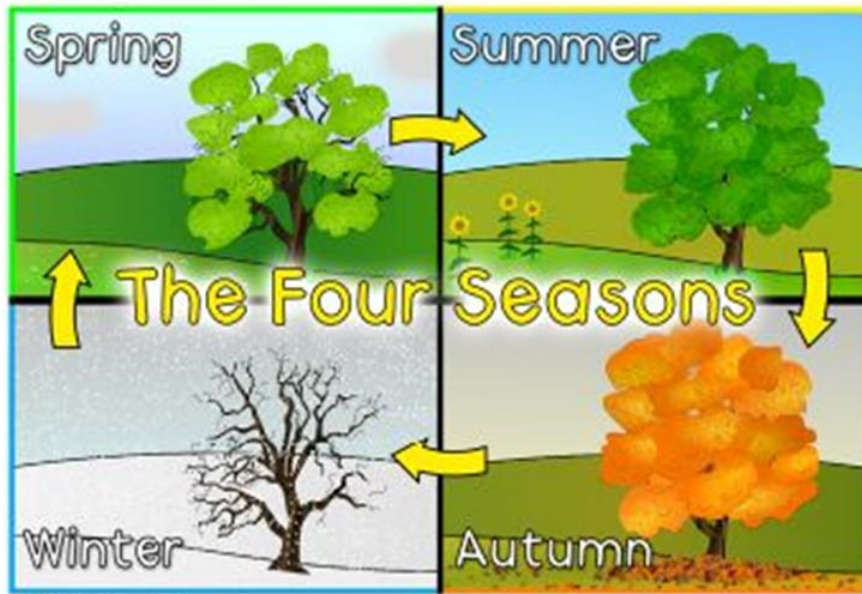
Be Curious. Be Creative. Be Determined. Be St. Peter's.

Chemistry



EYFS Knowledge Mats

What happens in the seasons? (Year R) The World



Sunny



Cloudy



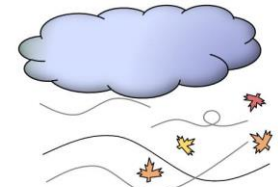
Stormy



Snowy



Rainy



Windy

Key vocabulary

Summer	The warmest season of the year, from June to August.
Autumn	The season after summer, from September to November. The weather is getting colder.
Winter	The coldest season of the year, from December to February.
Spring	The season after winter, from March to May. The weather is getting warmer.
Day time	The part of the day that is light.
Night time	The part of the day that is dark.

*How will I know
when the
seasons change?*

Key objectives

	Describe what they see, hear and feel whilst outside
	Explore the natural world around them
	Understand the effect of changing seasons on the natural world around them
	Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class

What are materials? (Year R)

The World

What's the best material for the three little pig's house?



brick



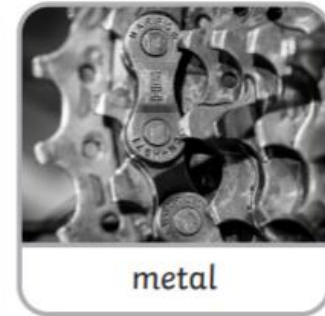
fabric



plastic



wood



metal



paper



stone



water



glass

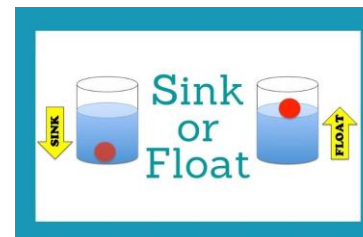
What materials are in the classroom?

Key vocabulary

Hard	Not easily broken or bent.
Soft	Easy to change shape.
Bendy	Easy to bend.
Rough	It feels and looks bumpy.
Smooth	Objects that have no lumps or bumps.
Stretchy	Can be pulled to make it longer or wider without breaking it.
Shiny	Reflects light easily.
Shadow	Dark area where light is blocked.

Key vocabulary

Strong	Not changed or broken.
Float	Rest on the surface of water without sinking.
Sink	Go down below the surface or to the bottom.



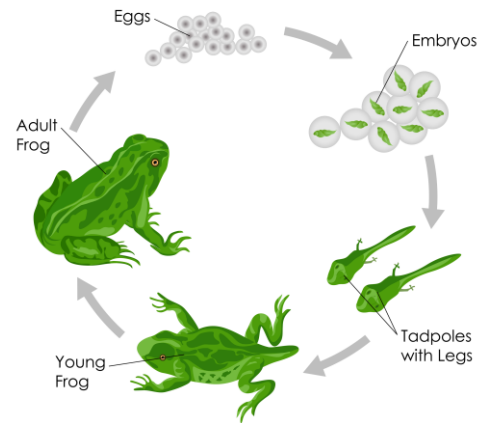
Key objectives

	Understand some important processes and changes in the natural world around them, including changing states of matter
	Explore the natural world around them
	Know some similarities and differences between the natural world around them and contrasting environments,

What is a life cycle? (Year R)

The World

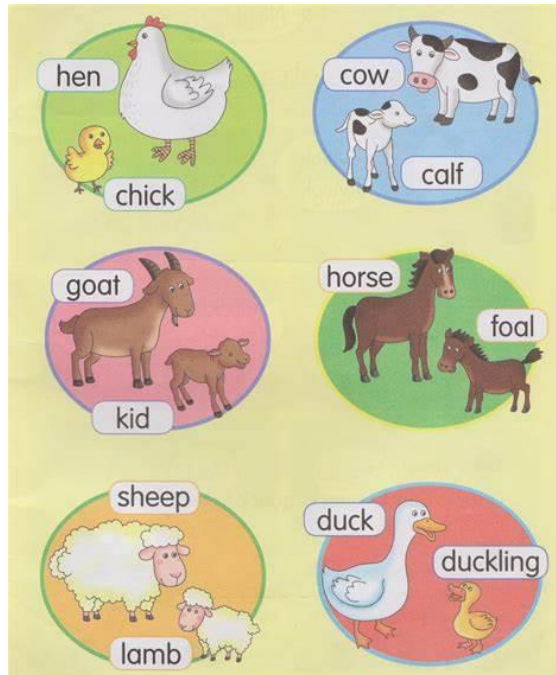
How do we grow and change?



How does a plant grow?

Key vocabulary

seed	The beginning of a plant.
root	The part of the plant that takes the water and is usually in the soil.
stem	The stem supports the leaves, flower and fruit, on the plant.
leaf	A flat part attached to the stem of a plant.
grow	Change or get bigger
Life cycle	The changes as an animal or person develops.
amphibian	Cold blooded animal that lives on water and land. It lays eggs.
egg	Laid by an animal



Key objectives

Understand some important processes and changes in the natural world around them.

Describe what they see, hear and feel whilst outside

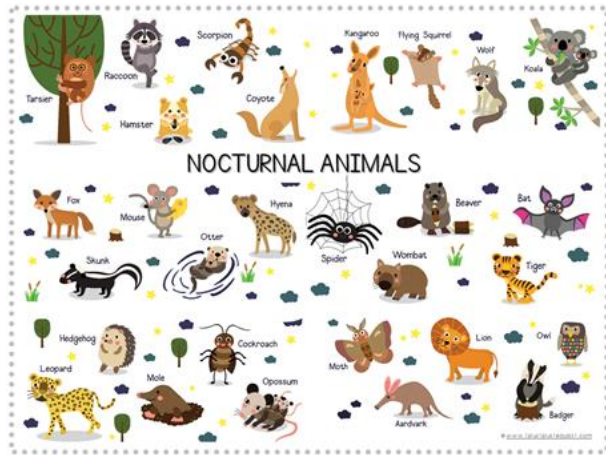
Understand the effect of changing seasons on the natural world around them

Explore the natural world around them, making observations and drawing pictures of animals and plants.

Know some similarities and differences between the natural world around them and contrasting environments.

How are animals different? (Year R)

The World



What animals would you find in Newton Park and Lake?



Key vocabulary

Animal	A living thing, not human.
Human	A person.
Hibernate	An animal that stores food and sleeps through the winter.
Carnivore	An animal that eats only meat.
Omnivore	An animal that eats plants and meat.
Herbivore	An animal that eats only plants.
Local	A place nearby.
Rock pool	Pools in rocks that are filled with sea water and sea life.
Nocturnal	An animals that is awake at night.
Dinosaurs	A group of reptiles that lived millions of years ago.
Reptile	A cold blooded animal with scales or plates.

Key objectives

Explore the natural world around them, making observations and drawing pictures of animals and plants.

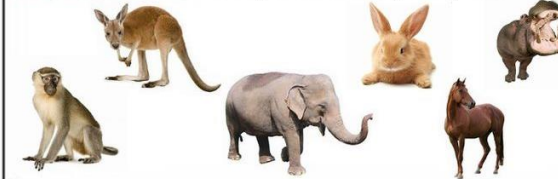
Know some similarities and differences between the natural world around them and contrasting environments.

Describe what they see, hear and feel whilst outside

Carnivore – an organism that only eats animals (meat).



Herbivore – an organism that only eats plants.



Omnivore – an organism that eats plants and animals.



Hibernating Animals



What would you find in a UK rock pool?

Key Stage 1 and 2 Knowledge Mats



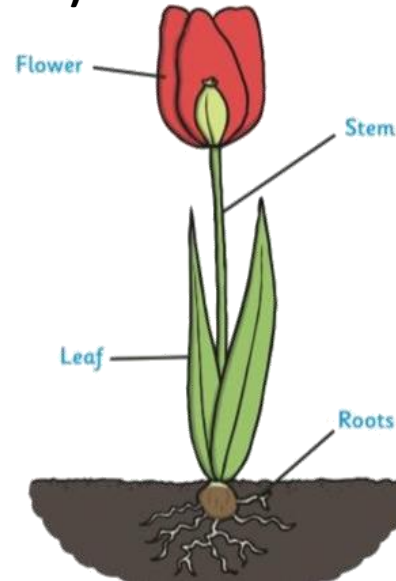
What kinds of life are there?

1. What is alive?
(Year 1)
2. Living things:
what's the same
and what's
different? (Year 4)
3. Living things:
what's the same
and what's
different? (Year 6)

What kinds of life are there? – What is alive? (Year 1)

Key vocabulary

Wild plant	A wild plant seed grows where it lands. It doesn't need to be planted or cared for.
Garden plant	Garden plants are plants that people choose to grow in their gardens.
roots	The part of the plant that attaches it to the ground. They take in water and nutrients.
leaf	Leaves catch sunlight so that the plant can make its own food.
stem	The stem holds the plant up and carries water and nutrients from the roots to the leaves and flowers.
flower	Flowers attract insects and birds
seeds	Seeds grow into new plants.
bulbs	Bulbs grow into new plants.



A flowering plant

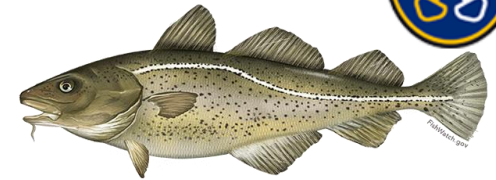


Deciduous

Evergreen

Why do some people choose to become vegetarian?

Fish



Cod fish can be found in the River Mersey.

Birds



Coots can be found in local ponds.

Reptiles



Sand lizards can be found in Formby.

Mammals



You can spot roe deer around Newton!

Amphibians

There aren't many Great Crested Newt left. Look carefully in our local ponds.



Meat and Plants

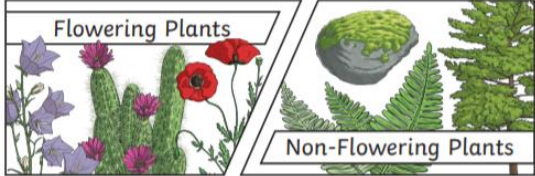


Meat

Plants





Prior Learning (Development matters)	Local links	Unit Objectives
- I can name and describe some plants and animals. - I can make focussed observations of the natural world. - I can describe and comment on things I have seen outside, including plants and animals.	- There are maple trees, horse chestnut trees, and oak trees on our school grounds. - You can find plaice, cod and flounder in the River Mersey. - You can find great crested newts, adders, sand lizards, red squirrels, roe deer and cormorants in the North West.	- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (Maple tree, Horse Chestnut, Oak- school grounds) - Identify and describe the basic structure of a variety of common flowering plants, including trees. - Identify and name a variety of common animals including fish (in the Mersey are plaice, cod and flounder), amphibians (great crested newt, frog, toad) , reptiles (adders, sand lizard- Formby), birds (coot, swift, cormorant) and mammals (otters, red/grey squirrels, fallow deer, bat) - Identify and name a variety of common animals that are carnivores, herbivores and omnivores
		Where next? Living things: What's the same and what's different? (Year 4) 

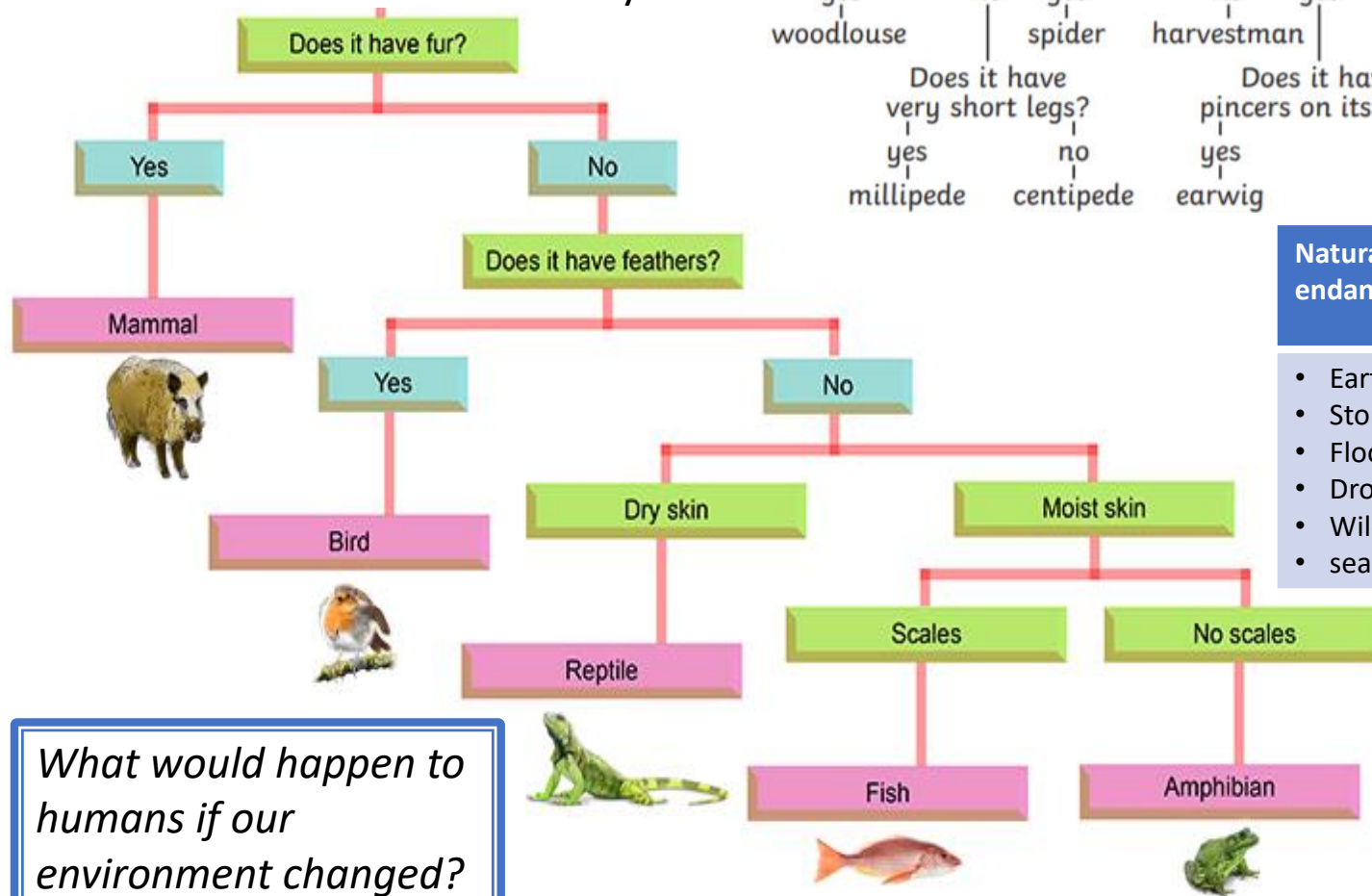
What kinds of life are there? – Living things: what's the same and what's different? (Year 4)



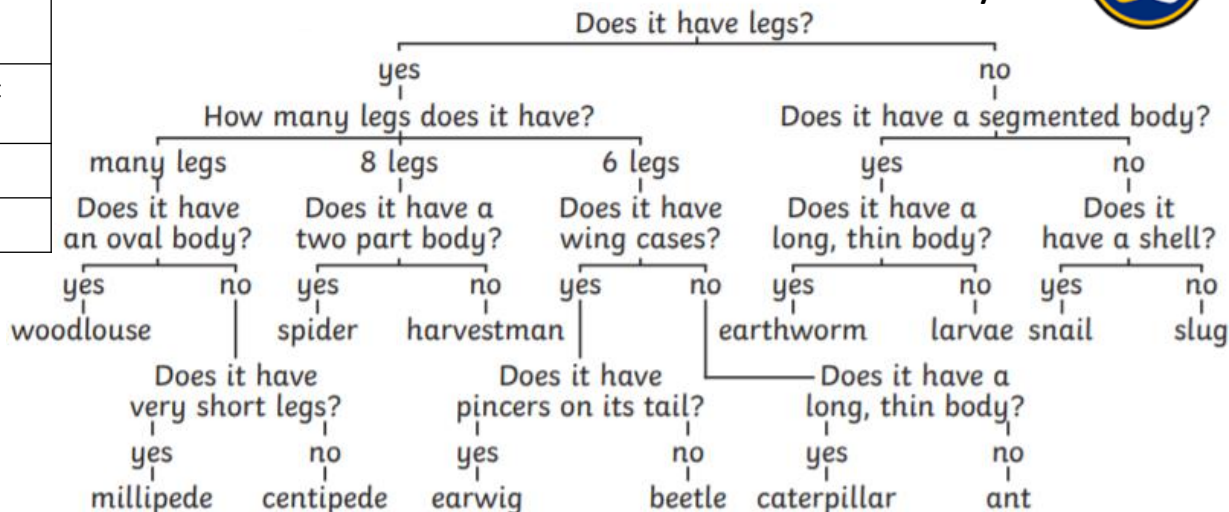
Key vocabulary

Classification	When plants or animals are placed into groups according to their similarities.
Characteristics	The distinguishing features or qualities that are specific to a species.
Vertebrates	Animals that have a back bone.
Invertebrates	Animals that don't have a back bone.

Vertebrate classification key



Invertebrate classification key



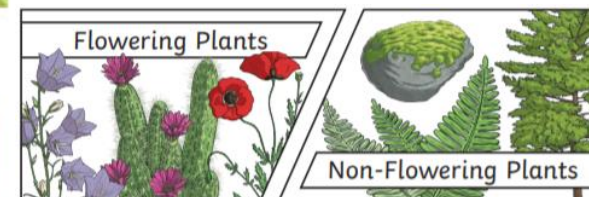
Natural changes that endanger habitats

- Earthquakes
- Storms
- Floods
- Droughts
- Wildfires
- seasons

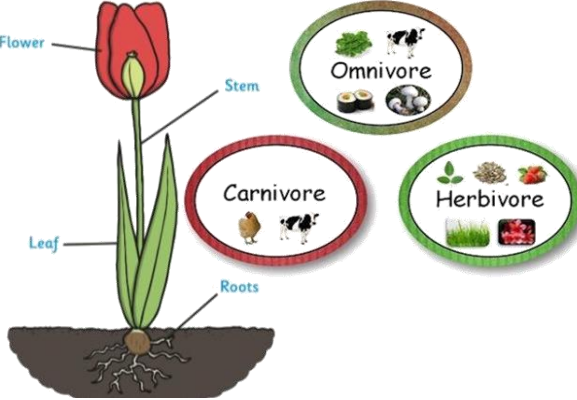
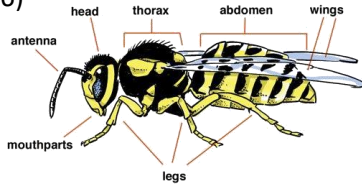
Human-made changes that endanger habitats

- Deforestation
- Pollution
- Urbanisation
- Introducing new animals to environments

What would happen to humans if our environment changed?



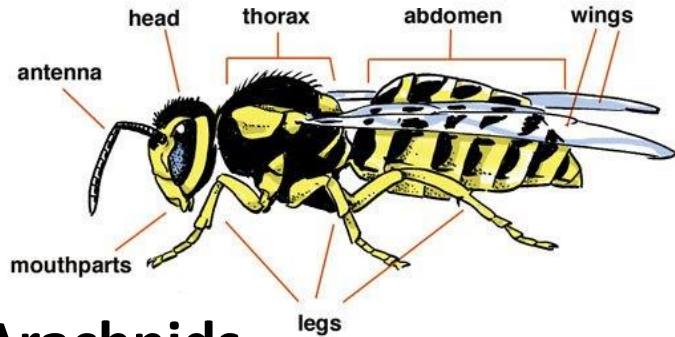


Prior Learning (Year 1)	Local links	Unit Objectives
 I can describe mammals, reptiles, birds, fish, and amphibians	- The Great Crested Newt and Water Vole are both protected in St Helens - You can find Natterjack toads, plaice, red squirrels, roe deer and cormorants in our local area	- Recognise that living things can be grouped in a variety of ways - Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment - Recognise that environments can change and that this can sometimes pose dangers to living things.
		Where next? Living things: What's the same and what's different? (Year 6) 

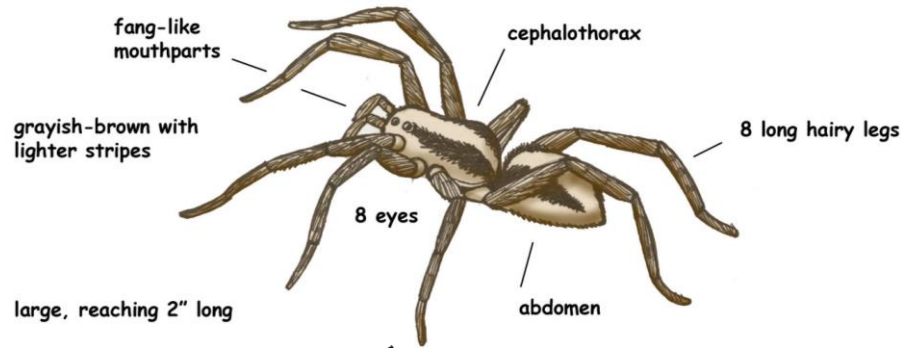
What kinds of life are there?- Living things: what's the same and what's different? (Year 6)



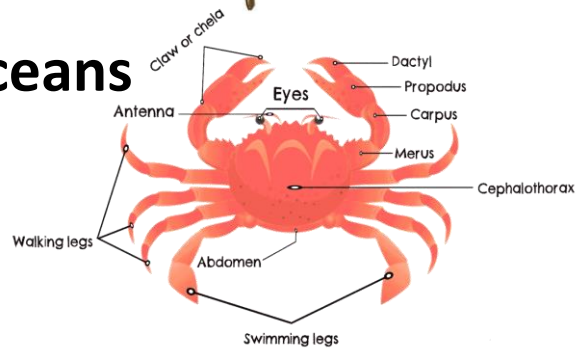
Insects



Arachnids



Crustaceans



How did an accident in a lab save millions of lives?

Classification

In 1735, Swedish Scientist Carl Linnaeus first published a system for **classifying** all living things. An adapted version of this system is still used today: The Linnaeus System.

Living things can be **classified** by these eight levels. The number of living things in each level gets smaller until the one animal is left in its species level. This is how a dog would be classified.



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

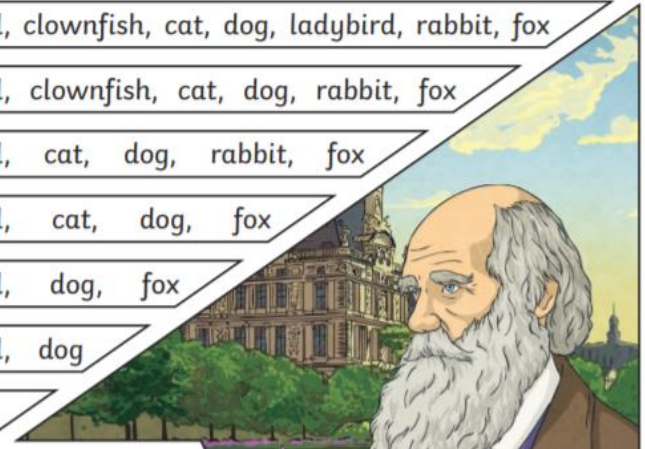
jackal, dog, fox

Genus: Canis

jackal, dog

Species: Lupus

dog



Helpful Microbes

Bacteria – cheese

Yeast – wine

Bacteria – yoghurt

Yeast – bread dough

Penicillium fungi - antibiotics

Harmful Microbes

Bacteria – salmonella is a bacterium that can lead to food poisoning

Virus – chicken pox and flu are examples of viral diseases

Fungi – athlete's foot

Bacteria – plaque

Fungi - mould

Key vocabulary

Organism

An individual animal, plant or single-celled life form.

Species

A group of similar organisms that can create offspring

Binominal name

How we name organisms, using their genus and species names.

Taxonomist

A scientist who classifies living things into groups.

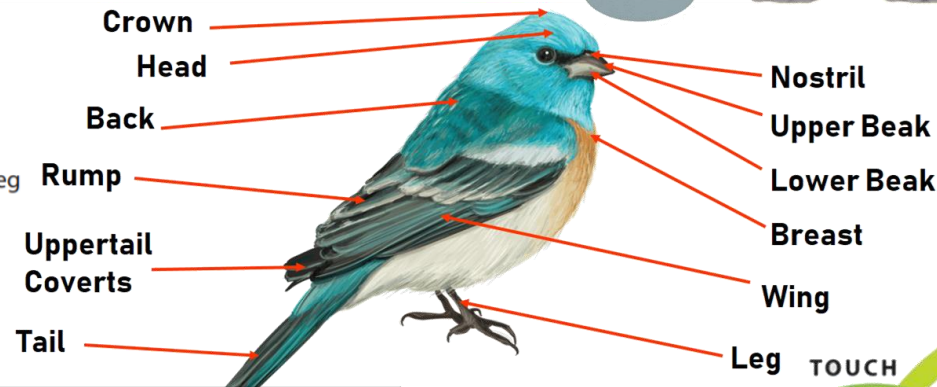
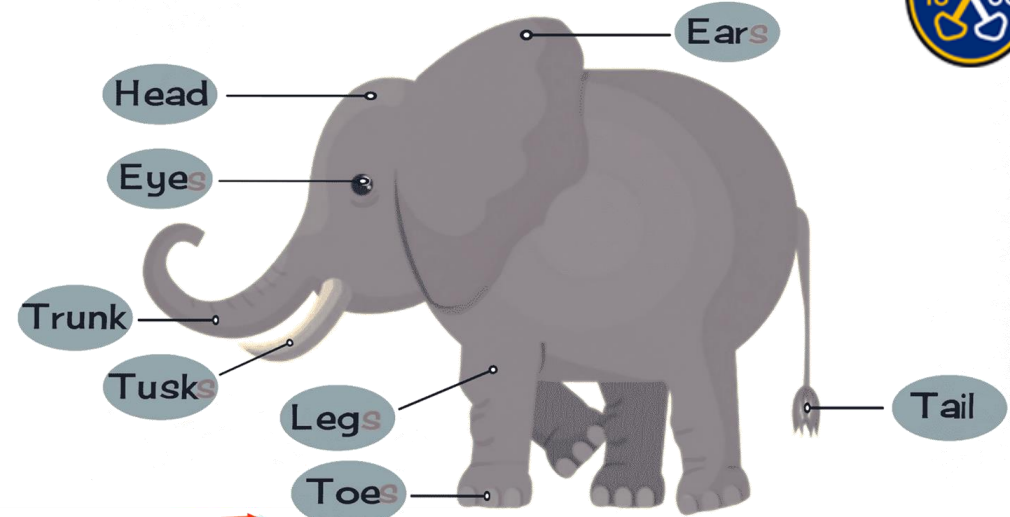
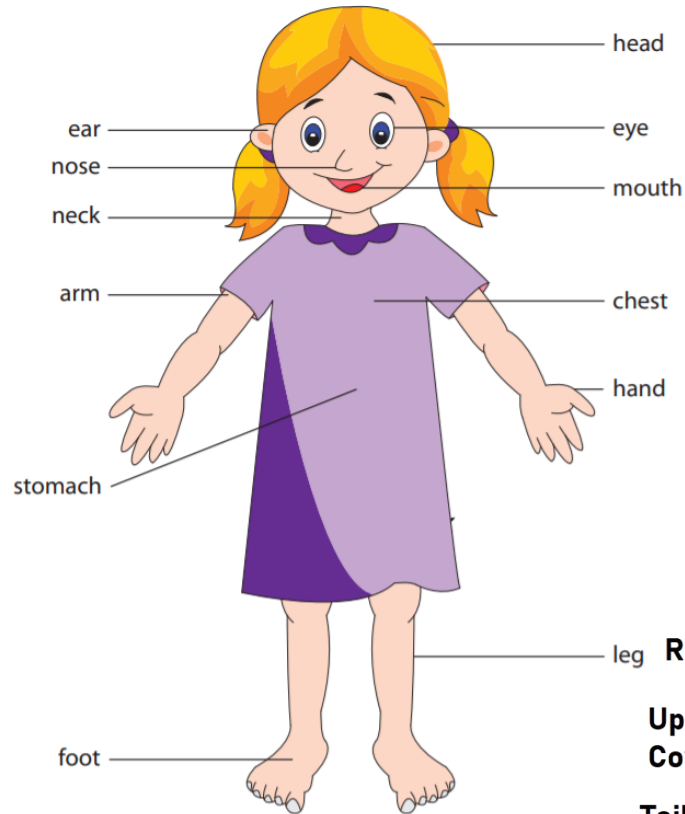


Prior Learning (Year 4)	Local links	Unit Objectives
- Living things can be categorised in a number of different ways - Environments can change, and this pose dangers to living things	- Local nature surveys and bug hunts. - Locally protected Great Crested Newts and Water Voles	- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals - Give reasons for classifying plants and animals based on specific characteristics
<pre> graph TD Q1[Does it have fur?] -- Yes --> M[Mammal] Q1 -- No --> Q2[Does it have feathers?] Q2 -- Yes --> B[Bird] Q2 -- No --> Q3[] Q3 -- Dry skin --> R[Reptile] Q3 -- Moist skin --> Q4[] Q4 -- Scales --> F[Fish] Q4 -- No scales --> A[Amphibian] </pre>		Where next? Eco systems, variation and adaption(Year 7)

How do living things work?

1. What are bodies and what can they do? (Year 1)
2. How can living things stay healthy? (Year 2)
3. How do living things work? (Year 3)
4. What do our bodies do with the food we eat? (Year 4)
5. How do our choices affect how our bodies work? (Year 6)

How do living things work?- What are bodies and what can they do? (Year 1)



Key vocabulary

Sight	Your eyes let you see all the things around you.
Hearing	Your ears let you listen to all the things around you. Your brain is able to tell what different sounds are.
Touch	Your skin gives you the sense of touch. You can tell if something is warm, cold, smooth or rough without even looking at it!
Taste	Your sense of taste comes from your tongue. You can tell if something tastes bitter or sweet. You might have some tastes you like and some you don't.
Smell	You smell using your nose. Your nose can tell if things smell nice or not nice

What would life be like without an eye/arm/sense of smell?



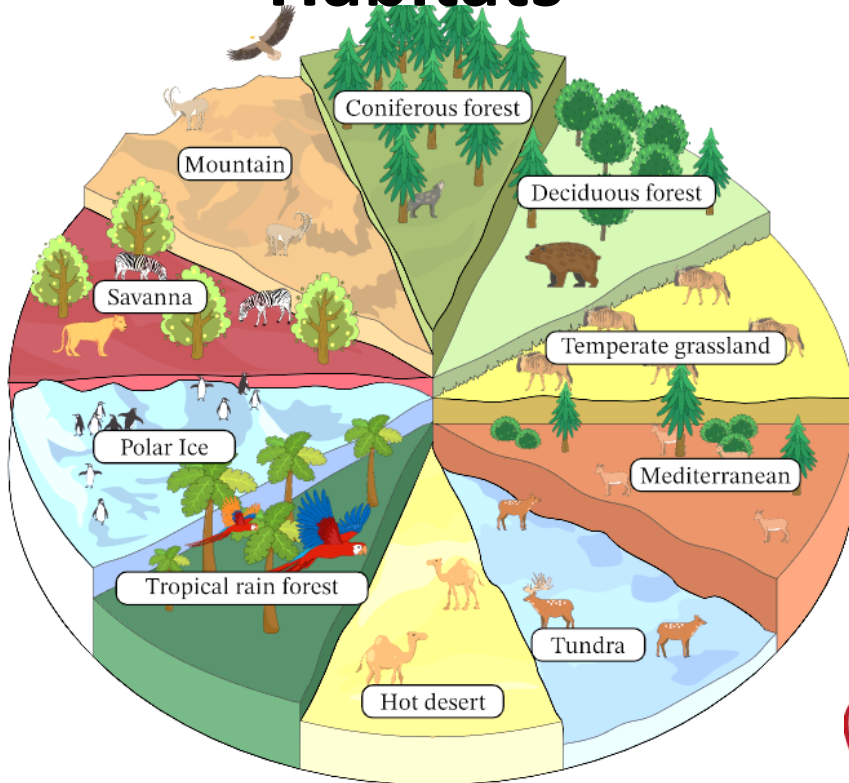


Prior Learning (EYFS)	Local links	Unit Objectives
How do we grow and change? 	• Would being tall or short be more suited to working in a mine shaft? • Are children taller or shorter than they were when the St. Helens mines were in operation? • How do the animals in Newton/St. Helens differ to those found in Australia or the Americas? • Links to SMSC/Jigsaw (disabilities)	Pupils should be taught to: - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense - Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Where next? How can living things stay healthy? Food chain 

How do living things work?- How can living things stay healthy? (Year 2)

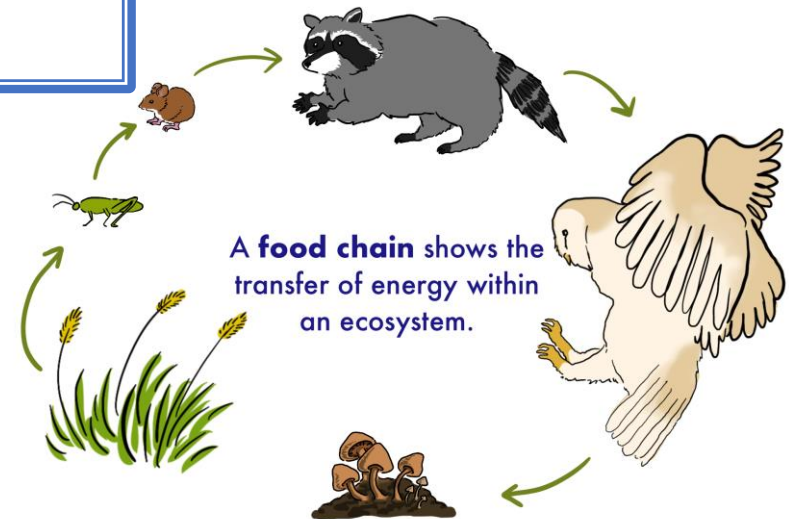


Habitats



What would life be like without a home?

Food chain



Key vocabulary

Habitat	The natural home of a living thing.
Micro-habitat	A small habitat which is different from the habitat or environment it is in.
Predator	An animals that hunts other animals for food.
Prey	An animal that is hunted by a predator.
Hygiene	Things we do to keep ourselves healthy and clean.
Nutrition	Food or nutrition.

Stay healthy

Get enough sleep

Eat and drink a balanced diet

Exercise regularly

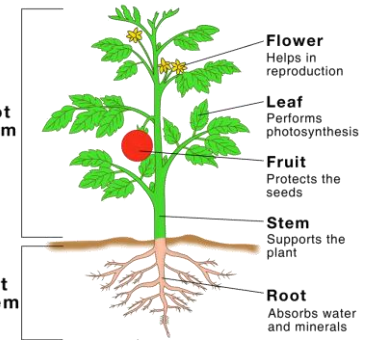
Spend time outside

Keep yourself clean

To stay healthy, plants need water, light and a suitable temperature.

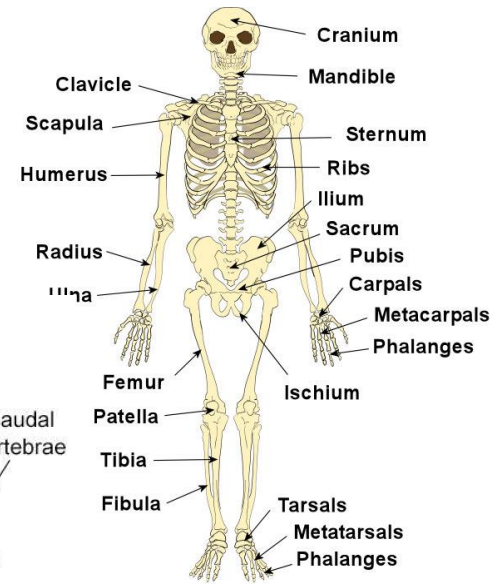
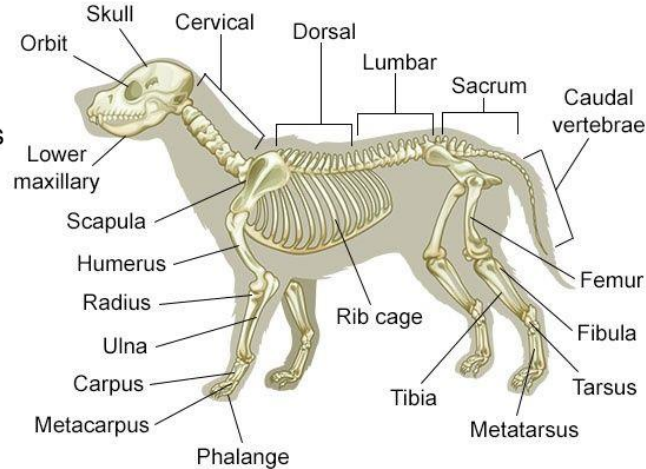
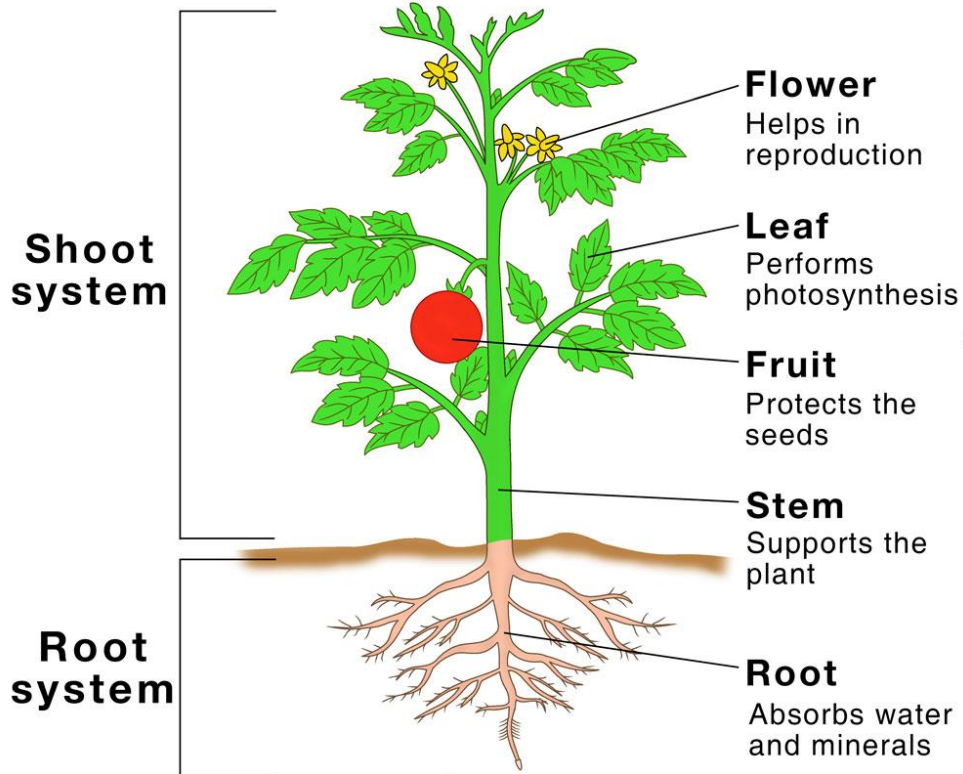




Prior Learning (Year 1)	Local links	Unit Objectives
- I know where my arm, leg and head is - I know that I experience the world using my 5 senses: sight, smell, hearing, taste and touch - I know that other living things look similar (a bird has a head and two legs too!)	- We have parks and play areas in which we can exercise - We have shops that provide us with food and clothing - You can find the Water Vole and Natterjack Toad in their local habitats, in the North West! - Can you fit the fox within its food chain?	- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other - Identify and name a variety of plants and animals in their habitats, including microhabitats (including protected species in St Helens- Great Crested Newt <i>Triturus cristatus</i>, and water vole <i>Arvicola aquaticus</i>, Natterjack Toad- Sefton) - Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. - Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
		Where next? How do living things work? (Year 3) Parts of a Plant 



Parts of a Plant



Exoskeleton— hard outer covering that protects, covers and allows for muscle attachment.

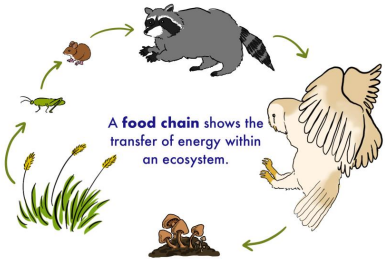
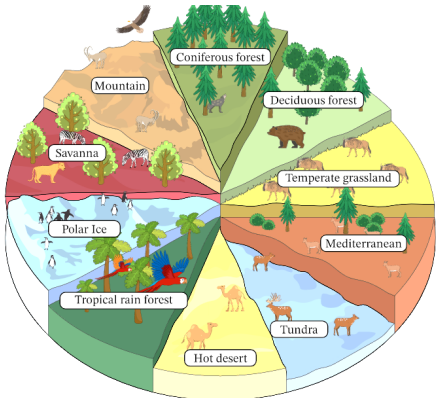
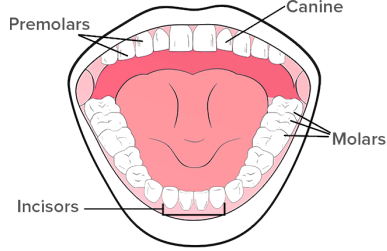


Key vocabulary

Skeleton	A framework of bones that support the body of a living thing.
Muscle	A bundle of fibrous tissues in an animal that contract in order to produce movement.
Contract	Become shorter or tighter.

What should I plant in my garden to attract wildlife?

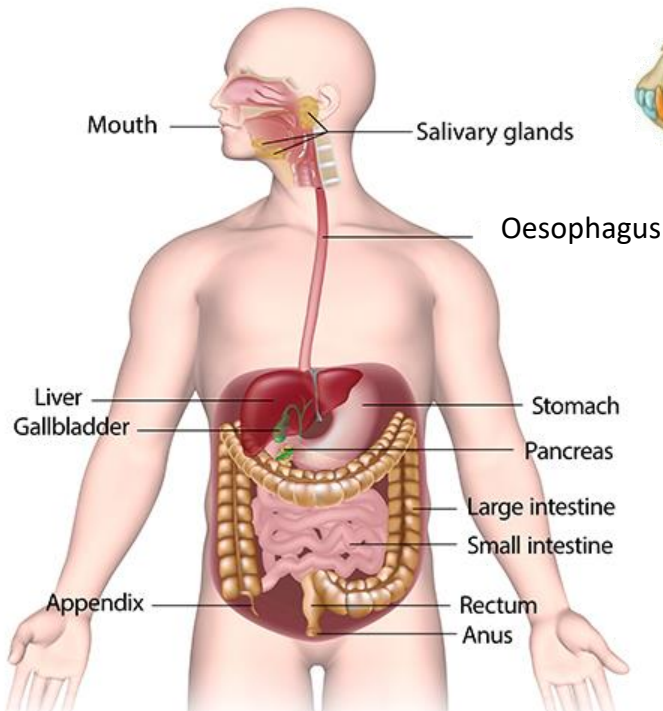


Prior Learning (Year 2)	Local links	Unit Objectives
Food chain  	What common flowers, plants and trees are there around Newton? What different animals (including insects with exoskeletons) can be found around Newton? Bug house (including skeletons) <u>World Museum- Liverpool</u>	Pupils should be taught to: - identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - identify that humans and some other animals have skeletons and muscles for support, protection and movement. Where next? What do our bodies do with the food we eat? (Year 4) 

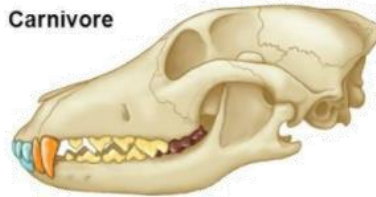
How do living things work?- What do our bodies do with the food we eat? (Year 4)



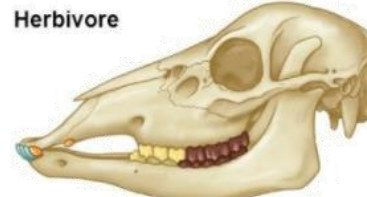
The Digestive System



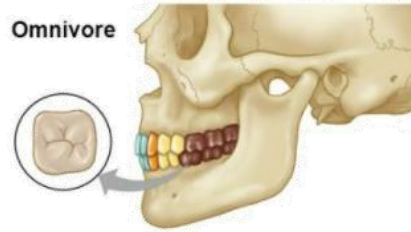
Carnivore



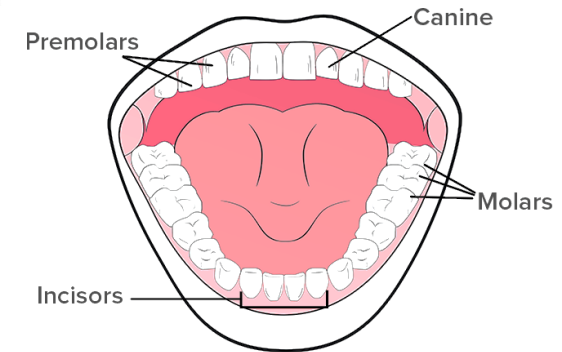
Herbivore



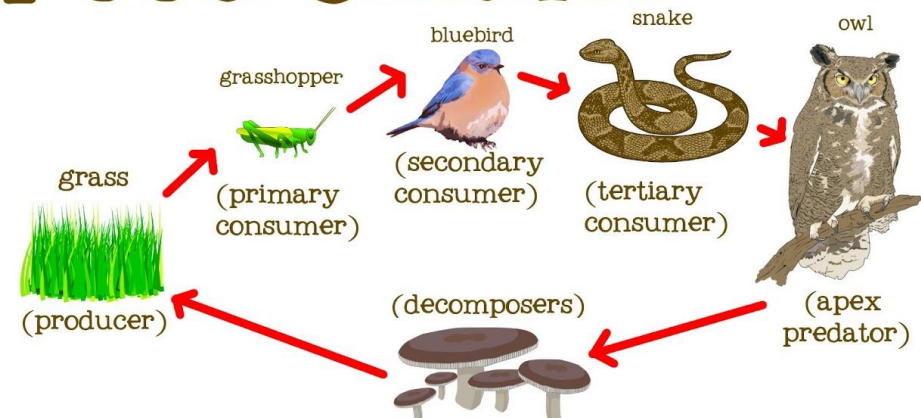
Omnivore



Incisors Canines Premolars Molars



Food Chains



Key vocabulary

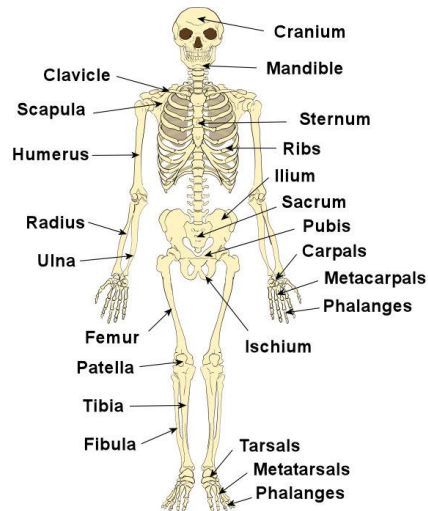
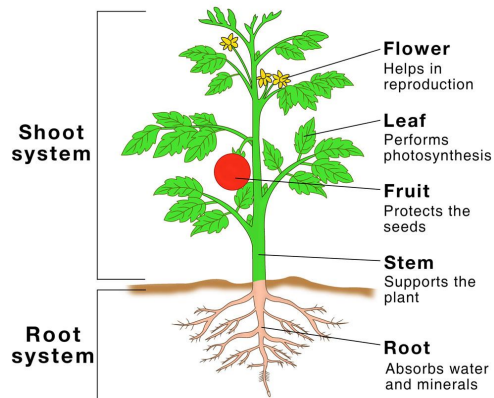
Incisor tooth	A narrow-edged tooth, great for cutting.
Molar tooth	A flatter tooth, great for grinding.
Canine tooth	A pointed tooth, great for tearing.
Producer	an organism that makes food. This is usually a green plant, because plants can make their own food
Consumer	an animal that eats a plant or another animal.
Digestive system	The organs that take in food and liquids and break them down into substances that the body can use for energy, growth, and tissue repair.

Why, and how, must we keep our teeth healthy?



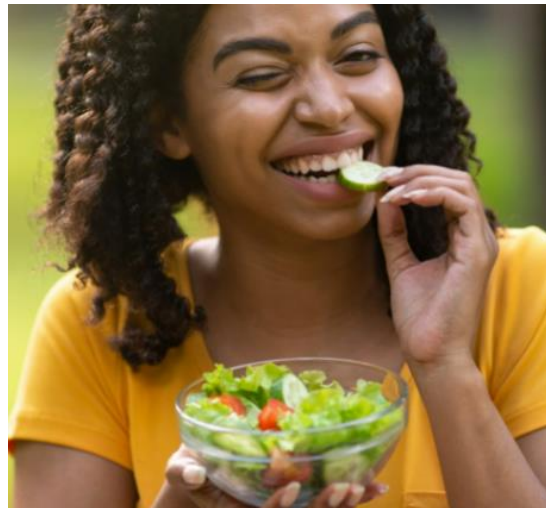
Prior Learning (Year 3)

Parts of a Plant



Local links

- Healthy Eating St Helens
- Bridgewater Oral Health Improvement



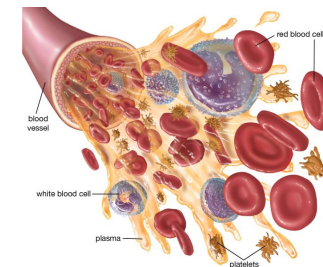
Unit Objectives

Pupils should be taught to:

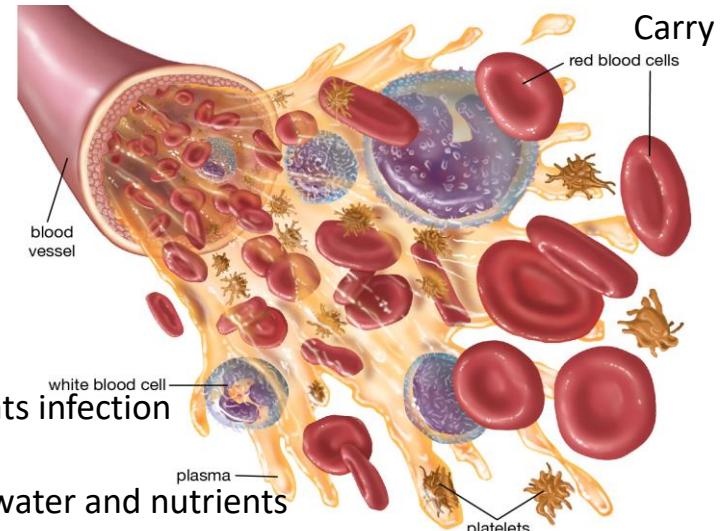
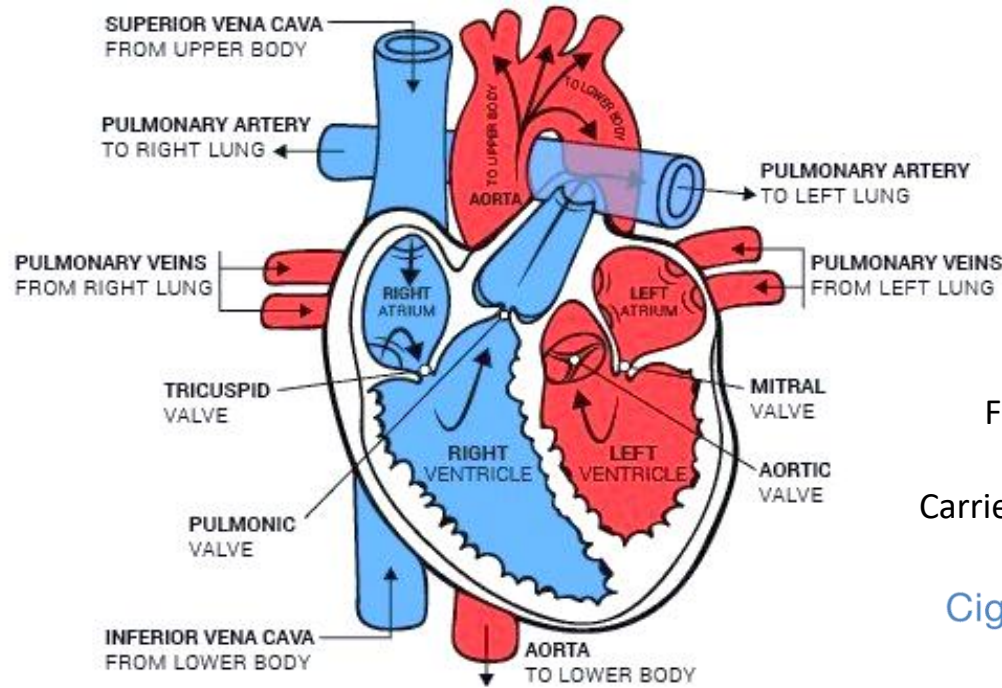
- ♣ describe the simple functions of the basic parts of the digestive system in humans
- ♣ identify the different types of teeth in humans and their simple functions
- ♣ construct and interpret a variety of food chains, identifying producers, predators and prey

Where next?

How do our choices affect how our bodies work?
(Year 6)



How do living things work?- How our choices affect how our bodies work? (Year 6)

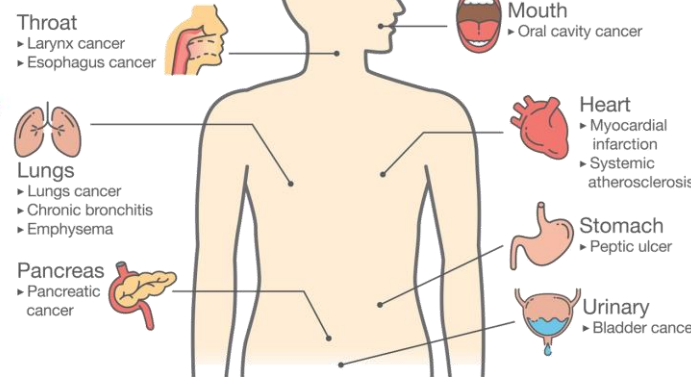
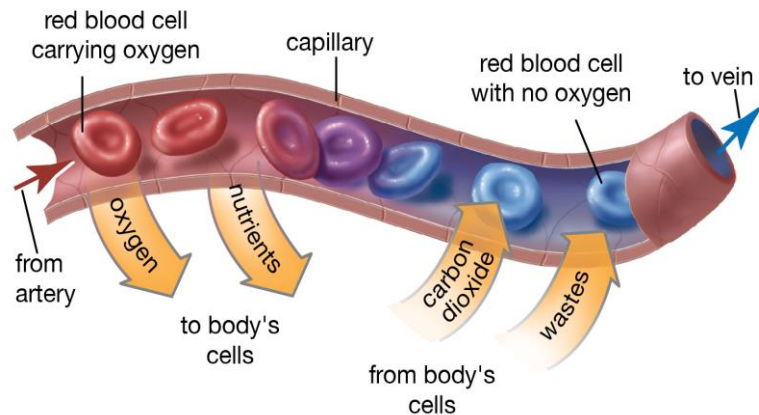


Fights infection

Carries water and nutrients

Coagulates (form scabs)

Health Effects of Cigarette Smoking



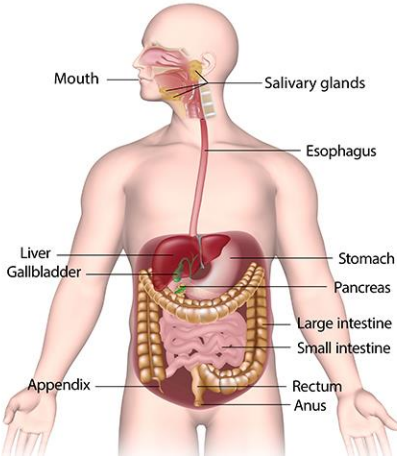
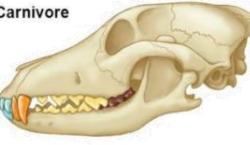
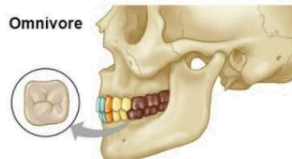
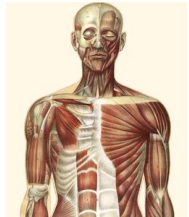
Key vocabulary

Circulatory system	The system that moves blood around your body.
heart	The organ that pumps your blood.
lungs	The organ that brings oxygen into your body.
absorb	Take in or soak up.
drugs	A substance or medicine that has an affect on the body.
exercise	Activity requiring physical effort.

Blood is red, never blue!

What might life be like for someone with sickle cell disease?



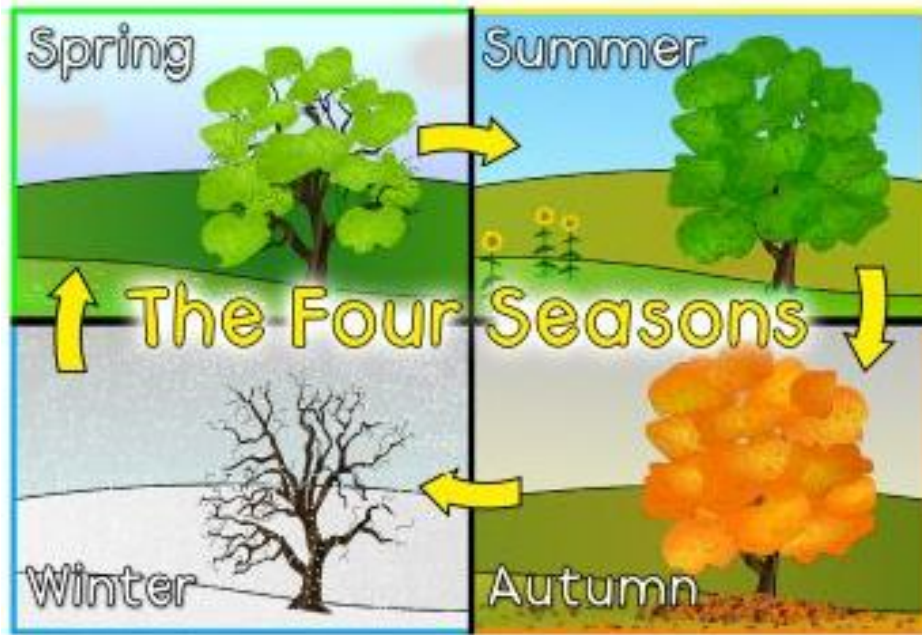
Prior Learning (Year 4)	Local links	Unit Objectives
The Digestive System  Carnivore  Herbivore  Omnivore  Incisors Canines Premolars Molars	- British Heart foundation - St Helens Healthy Living Team - SEQIRUS vaccine production  British Heart Foundation	Pupils should be taught to: ♣ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ♣ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ♣ describe the ways in which nutrients and water are transported within animals, including humans. Where next? The skeletal and muscular system <i>and</i> Nutritious and digestion (Key Stage 3) 



What makes life go on?

1. Does our world change or stay the same? (Year 1)
2. What is alive, dead or was never alive? (Year 2)
3. Do living things need different things to survive? (Year 3)
4. Do all life cycles look the same? (Year 5)
5. How do our bodies change as we get older? (Year 5)
6. How do living things change over time? (Year 6)

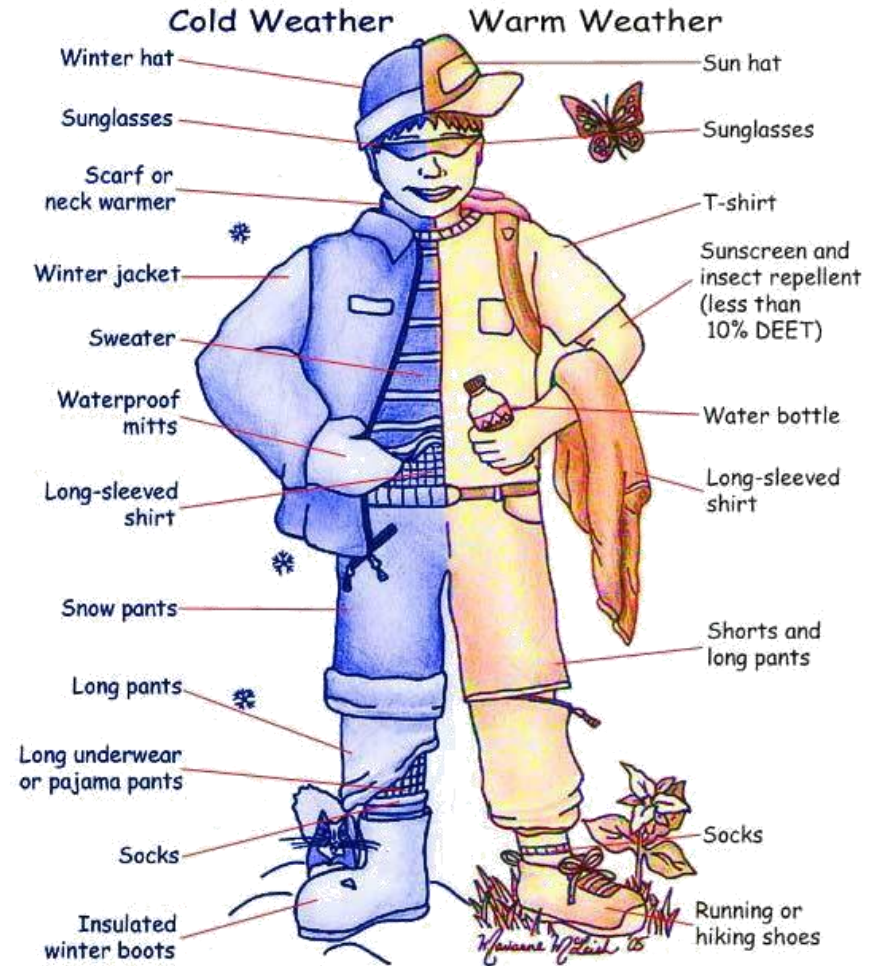
What makes life go on?- Does our world change or stay the same? (Year 1)



Key vocabulary	
Summer	The warmest season of the year, from June to August.
Autumn	The season after summer, from September to November. The weather is getting colder.
Winter	The coldest season of the year, from December to February.
Spring	The season after winter, from March to May. The weather is getting warmer.
Day time	The part of the day that is light.
Night time	The part of the day that is dark.

How do humans celebrate the changing weather around the world?

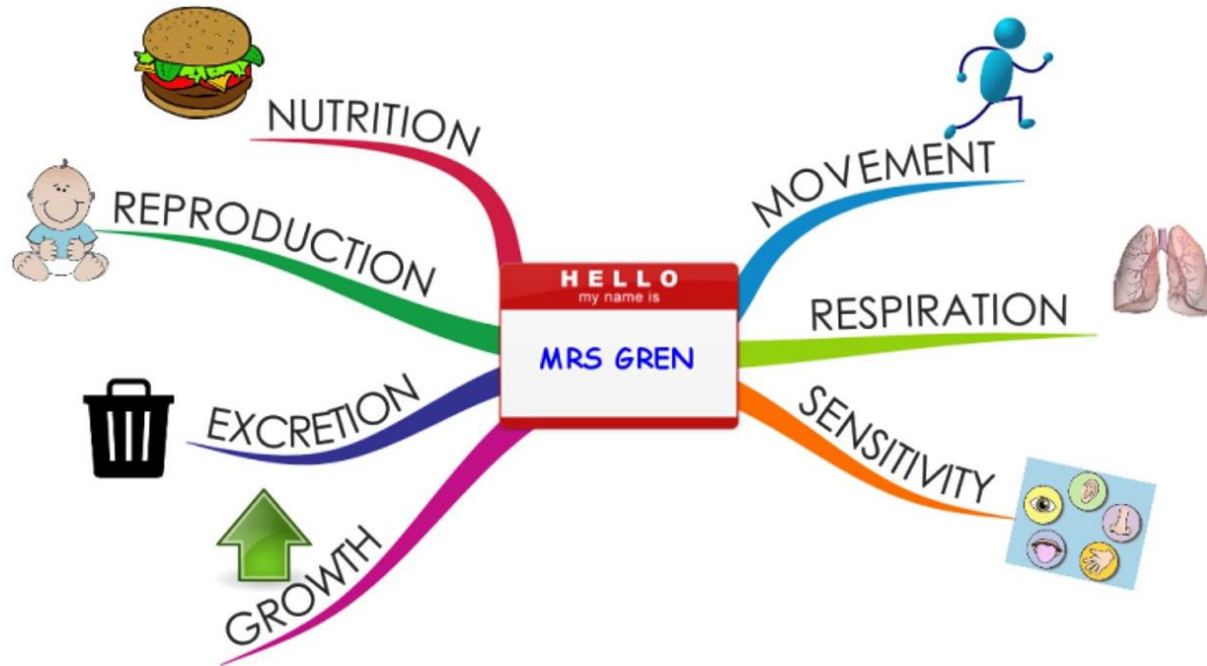
DRESSING FOR THE WEATHER





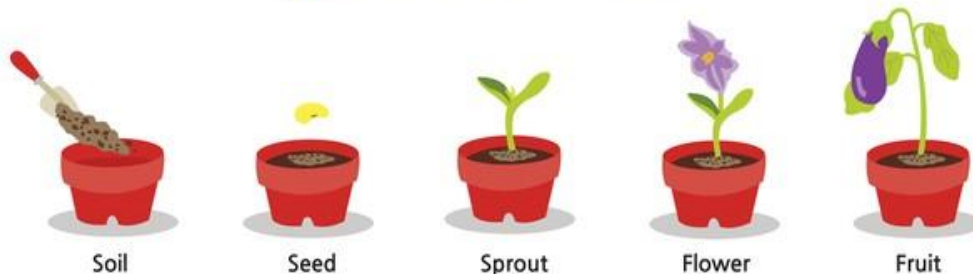
Prior Learning (Development Matters)	Local links	Unit Objectives
- I can name and describe some plants and animals. - I can make focussed observations of the natural world. - I can describe and comment on things I have seen outside, including plants and animals. - I know that some environments are different to the one in which I live. - I know the effect of changing seasons on the natural world around me.	<i>The rabbit problem</i>- Emily Gravett - What weather is most common in Newton? - Could Newton be improved to cope with this weather?	Pupils should be taught to: - observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies. Where next? What is alive, dead or was never alive? (Year 2)

What makes life go on?- What is alive, dead or was never alive? (Year 2)



Offspring- a human or animal's child or children.

Seed to Fruit



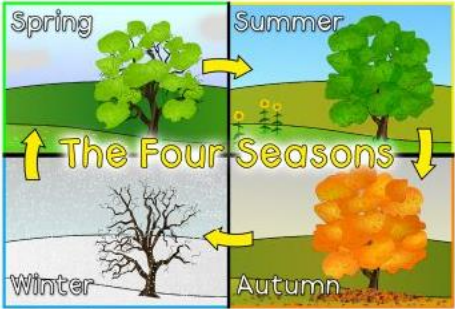
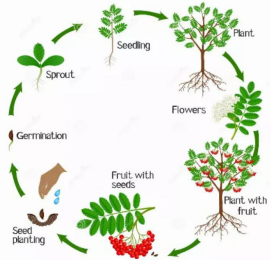
Seeds and bulbs grow into adult plants.

Key vocabulary

Nutrition	Food or nourishment.
Reproduction	Producing children or copies.
Excretion	How a living things gets rid of waste matter.
Growth	Increasing in size.
Movement	Change your place or position.
Respiration	The act of breathing.
Sensitivity	Being able to feel or sense something.

Do living things deserve to be looked after?

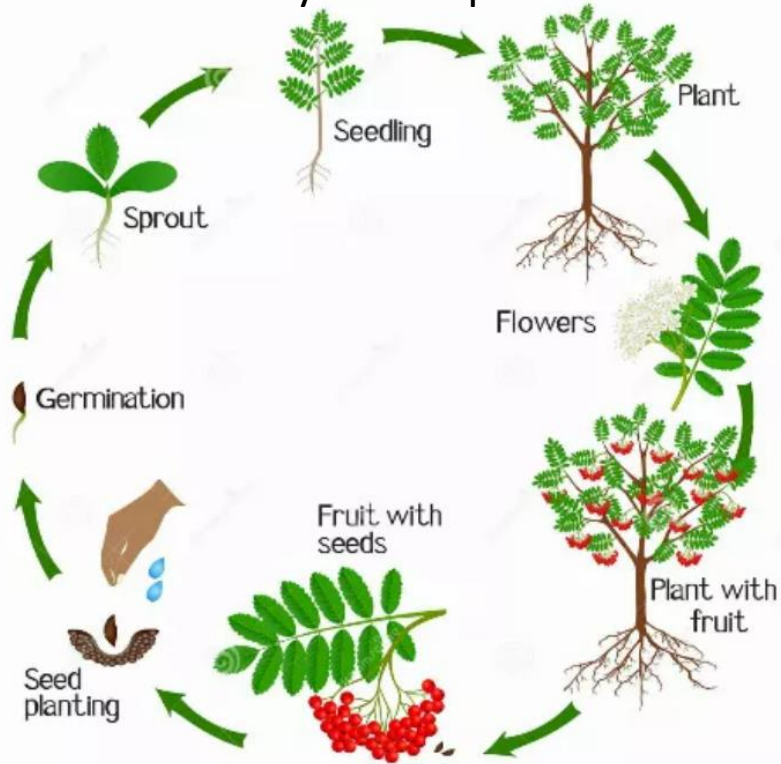


Prior Learning (Year 1)	Local links	Unit Objectives
- I can observe changes across the four seasons - I can observe and describe weather associated with the seasons and how day length varies. 	How long has your family been in Newton? How long have families settled and lived in Newton? Who were the first people here?	Pupils should be taught to: - explore and compare the differences between things that are living, dead, and things that have never been alive - observe and describe how seeds and bulbs grow into mature plants - notice that animals, including humans, have offspring which grow into adults Where next? Do living things need different things to survive? (Year 3) 

What makes life go on?- Do living things need different things to survive? (Year 3)



Life cycle of a plant



For life and growth, plants need:

Light

Water

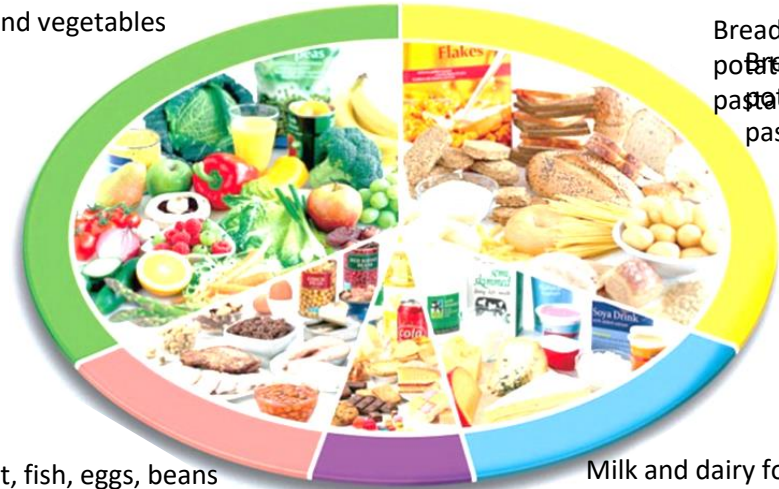
Air

Nutrients from soil

Room to grow

The Eat Well Plate

Fruit and vegetables



Bread, rice,
potatoes and
pasta

Meat, fish, eggs, beans

Milk and dairy foods

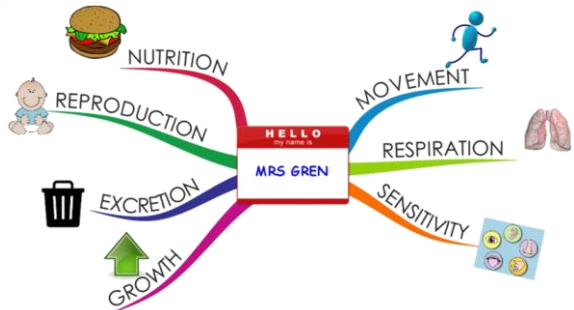
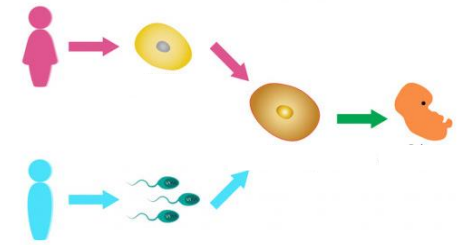
Foods and drinks high in fat and sugar

Key vocabulary

Nutrition	Food or nourishment
Protein	Foods that help us repair our cells and create new ones.
Carbohydrates	Sugars and starches that we need for energy.
Fibre	Foods (mostly plants) that help our digestive system function.
Fats	Fatty foods give us energy and help us absorb nutrients
Vitamins and minerals	Vitamins perform hundreds of roles in the body from converting food into energy to healing wounds.

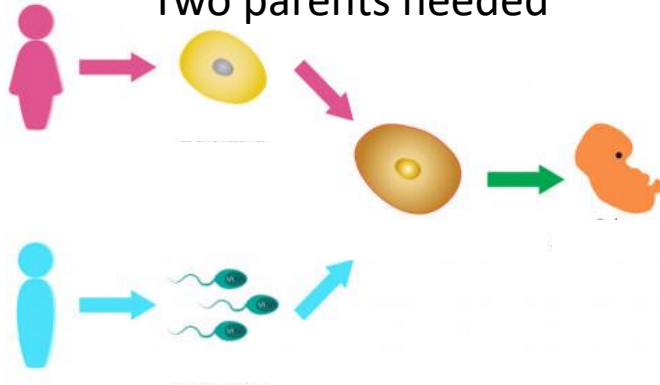
*Do different people need different diets?
Do different animals need different diets?*



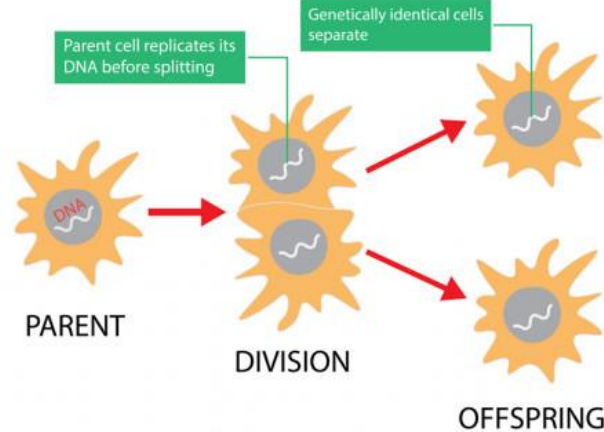
Prior Learning (Year 2)	Local links	Unit Objectives
 - Seeds and bulbs grow into mature plants - Humans and animals have offspring which grow into adults	Bluebells, columbine and foxgloves are common wildflowers in our local area. - Healthysthelens.co.uk is a great website to learn about healthy eating	- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - Investigate the way in which water is transported within plants - Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. - Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
		Where next? Do all life cycles look the same? (Year 5) 

What makes life go on?- Do all life cycles look the same? (Year 5)

Sexual Reproduction Two parents needed

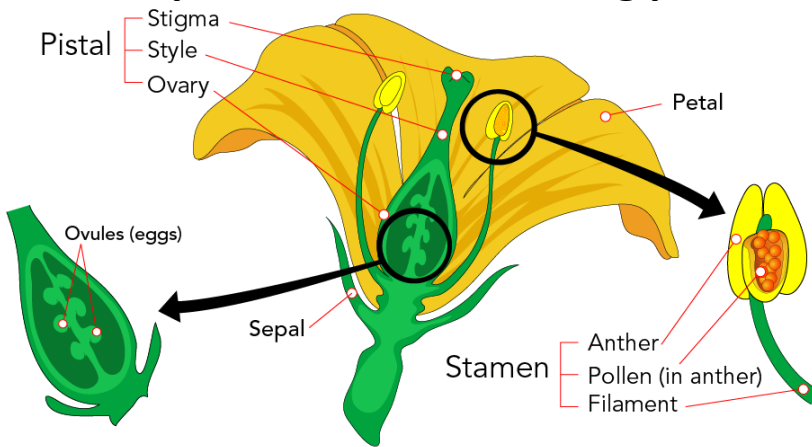


Asexual reproduction Only one parent needed



Jane Goodall- a famous primatologist who studied chimpanzee life cycles.

Reproduction in flowering plants



Key vocabulary

Reproduction	The production of offspring
Sperm	The reproductive cell produced by male humans and animals.
Egg	The reproductive cell produced by female humans animals.
Pollen	A powdery substance, produced by the male part of a flower, that the plant uses to fertilise the ovule (egg).
Germination	The process of a seed developing into a plant.
Metamorphosis	The process of an insect or amphibian turning from a child into an adult.
Fertilisation	The fusion of male and female reproductive cells that will form offspring.
Gestation	The length of time a foetus spends in its mothers womb.

How can we protect the life cycles of local endangered species?

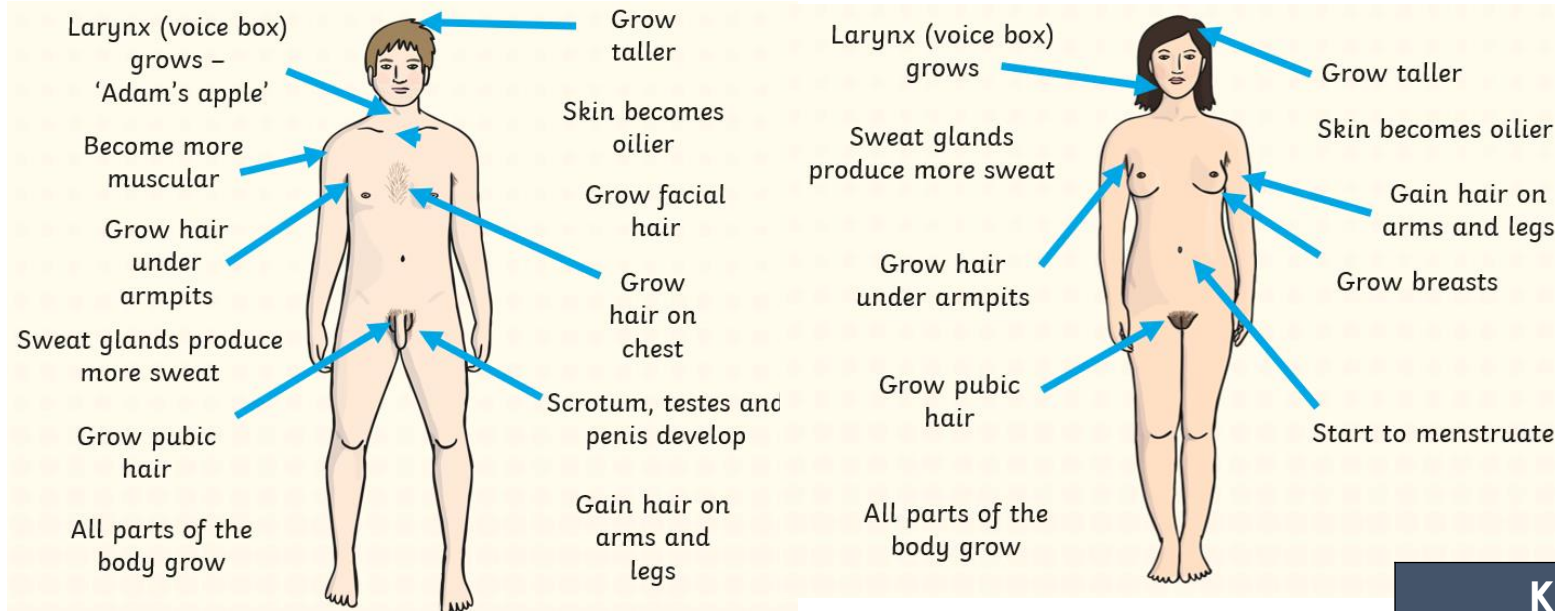


Prior Learning (Year 3)	Local links	Unit Objectives
 I must eat a balance of different foods in order to stay healthy	Bluebells, columbine and foxgloves are common wildflowers in our local area. - We can see many different life cycles in action at our local parks (Mesnes park and Willow park) - Farmers use their knowledge of plant life cycles to provide us with food.	- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (including protected species in St Helens- Great Crested Newt <i>Triturus cristatus</i>, and water vole <i>Arvicola aquaticus</i>) - Describe the life process of reproduction in some plants and animals. - Describe different types of reproduction, including sexual and asexual
		
Where next? How do our bodies change as we get older? (Year 5) 		

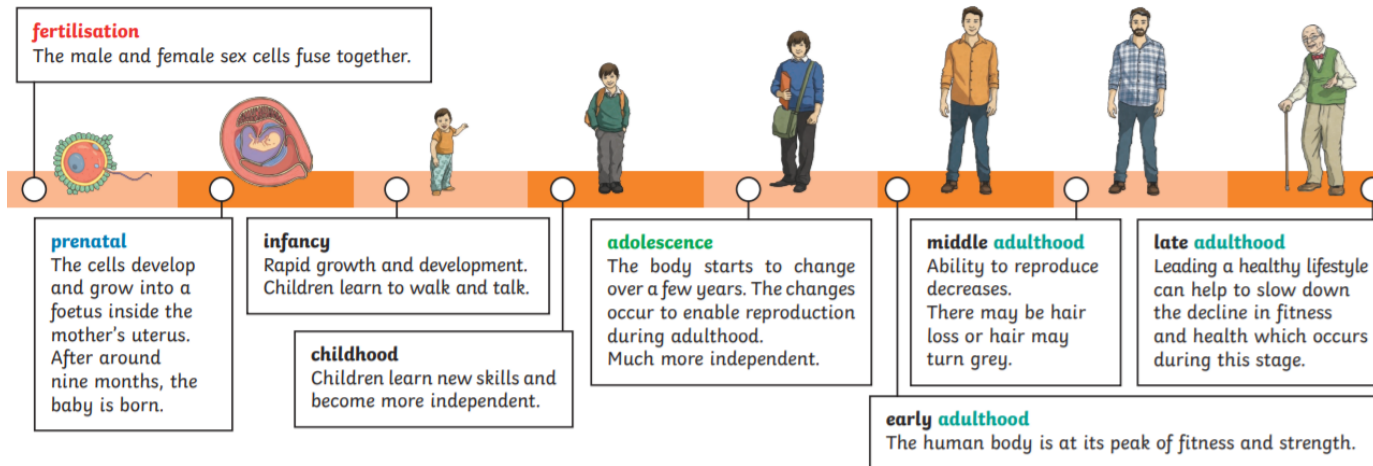
What makes life go on?- How do our bodies change as we get older? (Year 5)



How your body changes during puberty



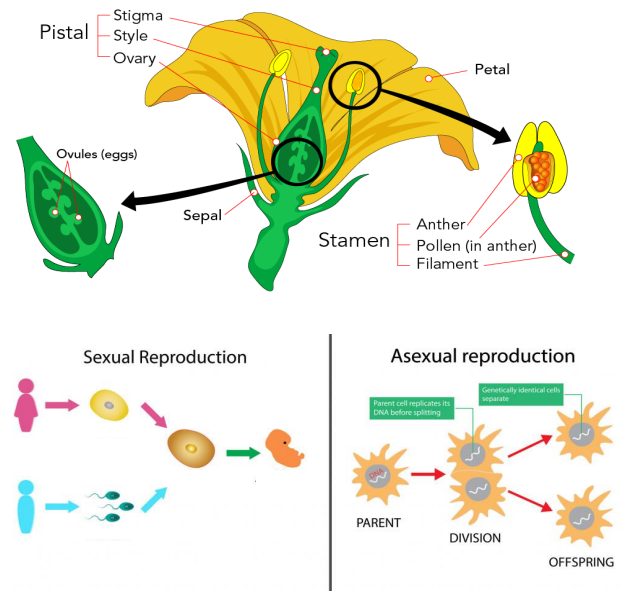
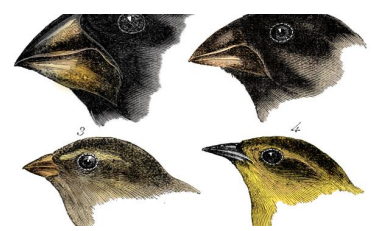
How will my body change over the next few years?



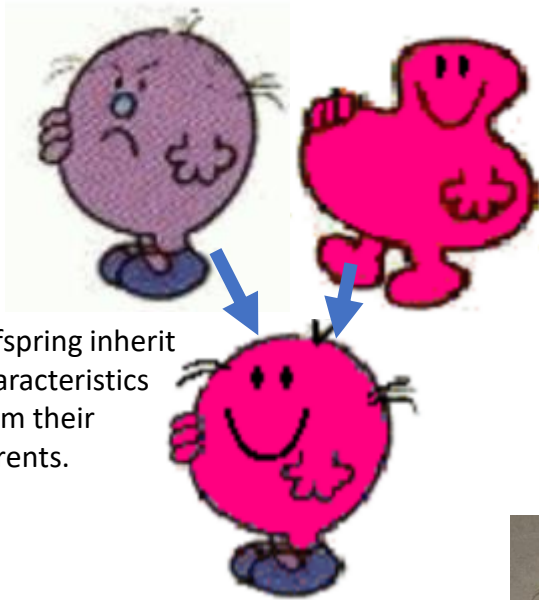
Key vocabulary

Offspring	A person's child or children.
puberty	A period of change in which a child turns into an adult.
Testosterone	A hormone that stimulates the changes that occur to boys during puberty.
Oestrogen	A hormone that stimulates the changes that occur to girls during puberty.
acne	A common skin condition that causes spots and pimples.
hygiene	Things that we do to keep clean and healthy
Life expectancy	The average period that a person may expect to live.

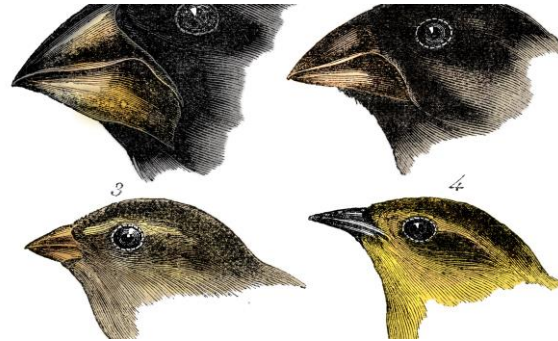


Prior Learning (Year 5)	Local links	Unit Objectives
Reproduction in flowering plants 	School nurses What facilities do we have in Newton for people of different ages? RSE and Jigsaw link-how might growing older affect our emotions and relationships?	Pupils should be taught to: ♣ describe the changes as humans develop to old age. ♣ They should learn about the changes experienced in puberty Where next? How do living things change over time? (Year 6) 

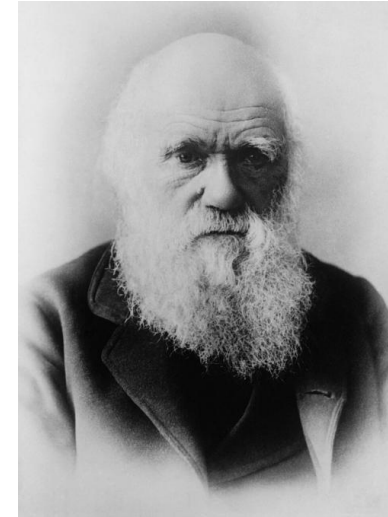
What makes life go on?- How do living things change over time? (Year 6)



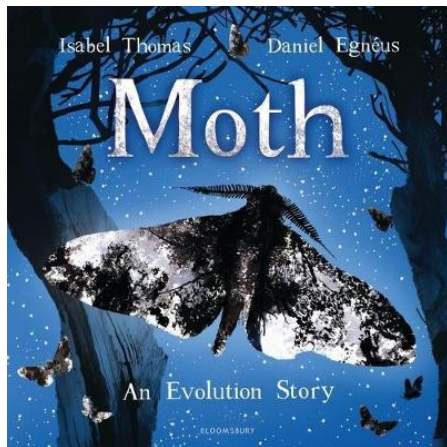
Offspring inherit characteristics from their parents.



Animals adapt over time so that they are suited to the environments in which they live.



Charles Darwin used all of this to create his 'Theory of Evolution'.



Environment can dictate which offspring survive and reproduce, and which do not.



Fossil evidence allows us to see what animals looked like millions of years ago.

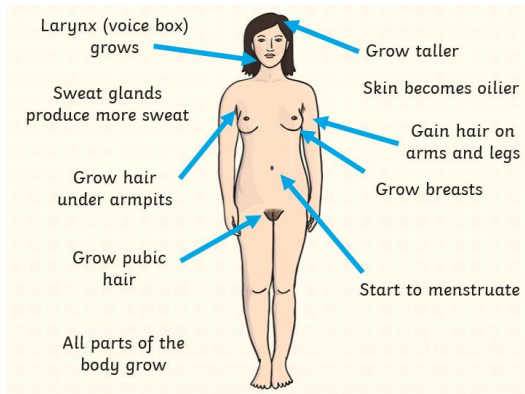
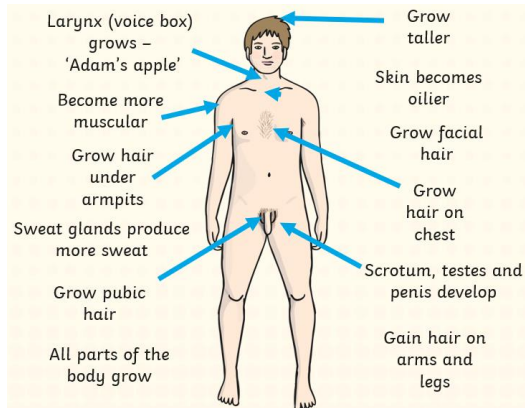
Key vocabulary

Characteristic	A feature or quality belonging to a person.
Inherited	Received (given) from one's parents.
Acquired	Learned or developed.
Adapt	Adjust to new conditions.
Evolution	The gradual development of something.
Natural Selection	The process whereby living things better adapted to their environment tend to survive and reproduce.
Variation	A difference or distinction.

Can we use the process of evolution to better people's lives?

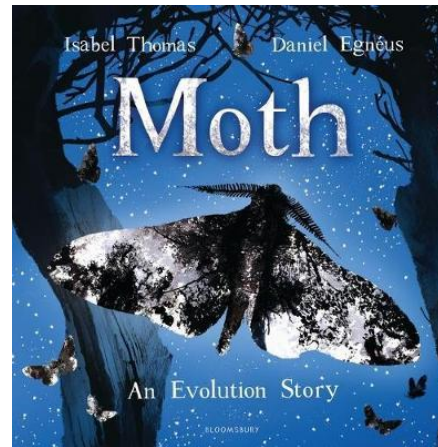


Prior Learning (Year 5)



Local links

How did changing Britain (including St Helens) affect the peppered moth?



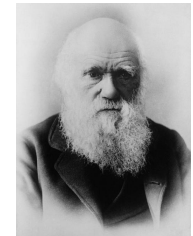
Unit Objectives

Pupils should be taught to:

- ♣ recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- ♣ recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- ♣ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Where next?

Genetics and evolution (Key Stage 3)



**What are things
made from?**

1. What are things made from? (Year 1)
2. How do we choose materials? (Year 2)
3. What are things made from and why? (Year 5)

What are things made from? (Year 1)



brick



fabric



plastic



wood



metal



paper



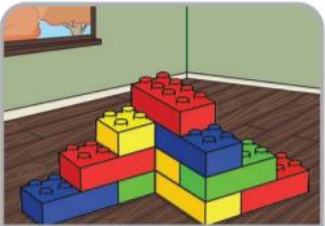
stone



water



glass



plastic toys



wooden furniture



metal tools



glass window



What's the best material for a bookshelf?

What materials do we use around Newton-le-Willows?

What's the best material for an umbrella?

Hard	Not easily broken or bent.
Soft	Easy to cut, fold or change shape.
Bendy	Easy to bend into a curved or folded shape.
Rough	It feels and looks uneven or bumpy.
Smooth	Objects that have no lumps or bumps.
Stretchy	Can be pulled to make it longer or wider without breaking it.
Shiny	Reflects light easily.
Dull	Doesn't reflect light. Doesn't look bright or shiny.
Waterproof	It keeps water out.
absorbent	It soaks liquid up.
Transparent	You can see through it.
Translucent	You can see shapes through it but not details.
Opaque	You can't see through it.



Prior Learning (Development matters)

- Explore the natural world around them
- Describe what they see, hear and feel

Local links

- **Glass making in St Helens**
- **Mining in St Helens**
- **Different materials around our school and Newton-le-Willows**

Unit Objectives

- Distinguish between an object and the material from which it is made
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- Describe the simple physical properties of a variety of everyday materials
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.



Where next?

How do we choose materials? (Year 2)



What are things made from? How do we choose materials? (Year 2)



Lots of objects can be made from one material.



One object can be made from different materials. Glass has been important to the people of St Helens for a very long time.



A wooden chair.

A plastic chair.

A metal chair.



How useful would a metal umbrella be?

Key vocabulary

Materials

Materials are what objects are made from.

Metal, wood, plastic, glass, rock, brick, fabric, wool, diamond, ceramic

Suitability

Having the properties which are right for a specific purpose.

Properties

What a material is like and how it behaves

Do we use different materials at home compared to at school?



Prior Learning (Year 1)	Local links	Unit Objectives
- Can I distinguish between the name of an object and the material from which it is made? - Can I identify and name a variety of everyday materials? (wood, plastic, glass, metal, water, rock) - Can I describe the simple physical properties of a variety of everyday materials.	• The World of Glass • Glass making at Ravenhead and Knauf in St Helens • Glass futures research facility- St Helens	- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses - Become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs, wood can be used for matches, floors and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). - Think about how the properties of materials can make them suitable or unsuitable for particular purposes and encouraged to think about unusual and creative uses for everyday materials.
		Where next? What are things made from, and why? (Year 5)  

What are things made from, and why? (Year 5)



Thermal insulators don't allow heat through. They are great for keeping things warm.



Thermal conductors allow heat through easily. Radiators need to be made of a thermal conductor.

Some metals are **attracted** to **magnets**. Magnets and magnetic materials are used in objects from fridges to computer screens.



Comparing a Mixture and Solution

Mixture



sand

+



water

You can separate the sand from the water by filtering.



Solution



sugar

+



water

The sugar is dissolved in the water. The sugar particles are evenly distributed in the water.



These changes are reversible.

Key vocabulary

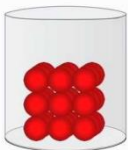
Conductor	Materials that allow heat, electricity or sound to flow through them easily.
Insulator	Materials that do not allow heat, electricity or sound to flow through them easily.
Thermal	Relating to heat.
Mixture	A substance made by mixing other substances together.
Solution	A special type of mixture in which one or more substances has dissolved.
Dissolve	A substance has become broken up and/or absorbed by a liquid. It is evenly distributed throughout the liquid.



Electrical insulators don't allow electricity through. A plastic coating keeps us safe from the electricity inside the wire.

Electrical conductors allow electricity through easily. Copper allows us to move electricity to where we need it.

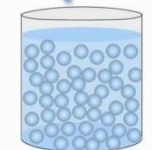
solid



- rigid
- fixed shape
- fixed volume

cannot be squashed

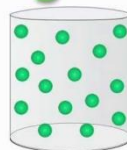
liquid



- not rigid
- no fixed shape
- fixed volume

cannot be squashed

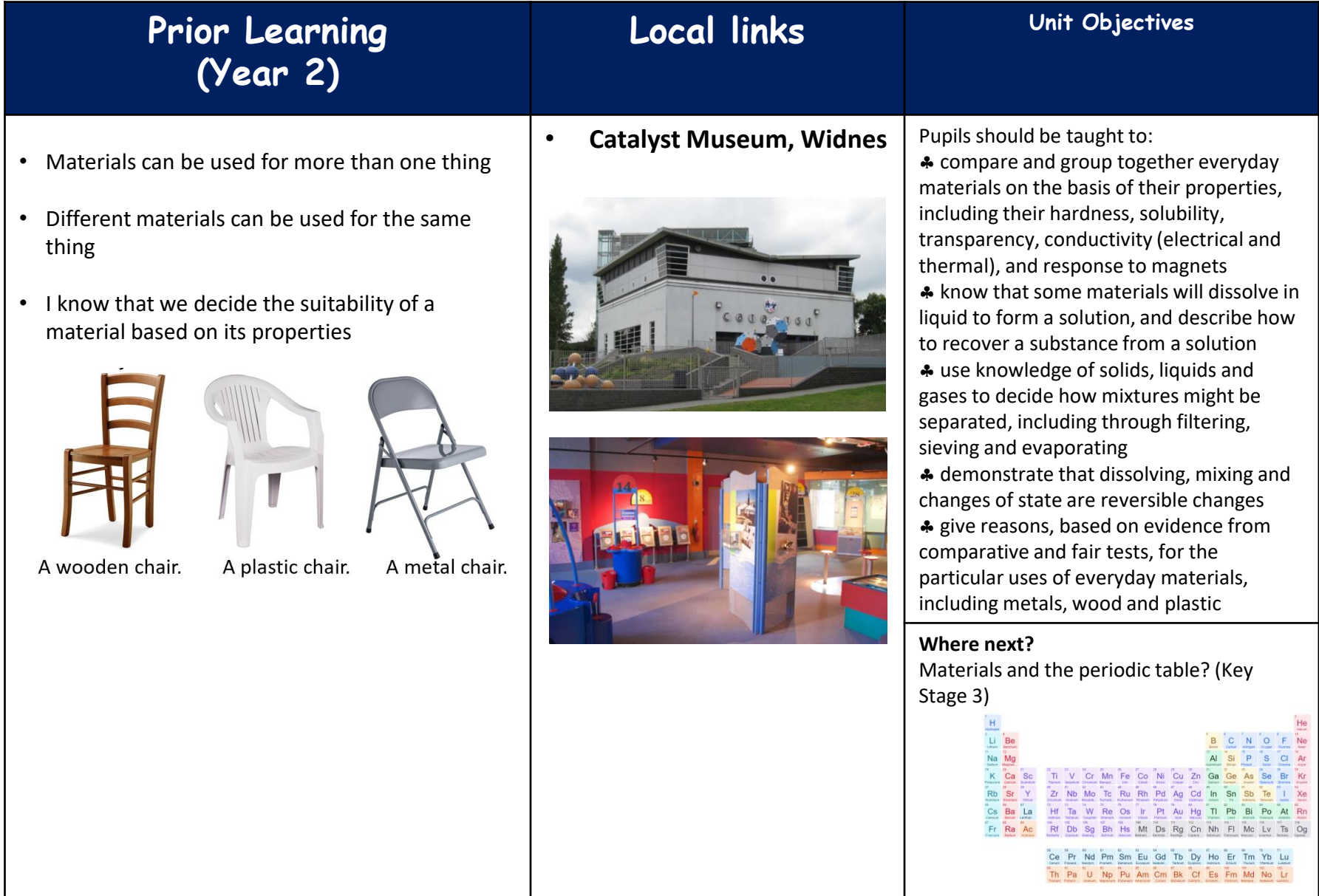
gas



- not rigid
- no fixed shape
- no fixed volume

can be squashed

Why, and how, do we clean water before drinking it?



**Is form
fixed?**

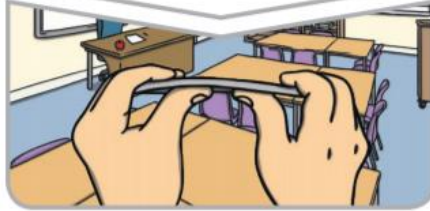
1. Can we change materials? Part 1 (Year 2)
2. Is water always wet? (Year 4)
3. Can we change materials? Part 2 (Year 5)

Is form fixed? Can we change materials? (Year 2)

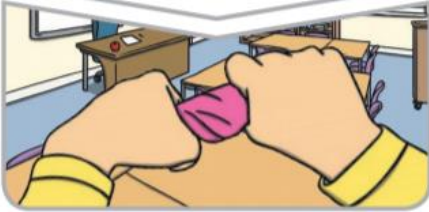
Squash an object by pushing both hands together.



Bend an object by grabbing both ends of the object and bringing the ends inwards together.



Twist an object by turning your hands in opposite directions.



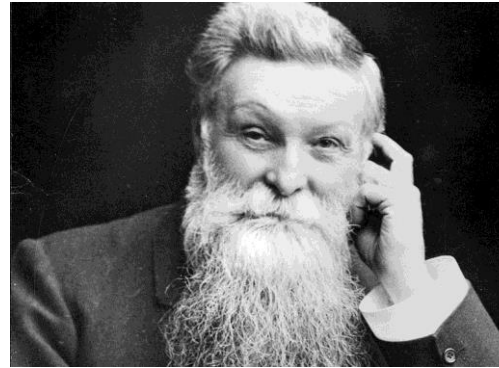
Stretch an object by pulling your hands slowly and gently apart.



Key vocabulary

Rigid	A material that cannot be bent or forced out of shape.
Flexible	A material that you can bend easily without breaking.
Absorbent	A material that can soak up liquid.
Elastic	A material that returns to its original shape after being bent or stretched.

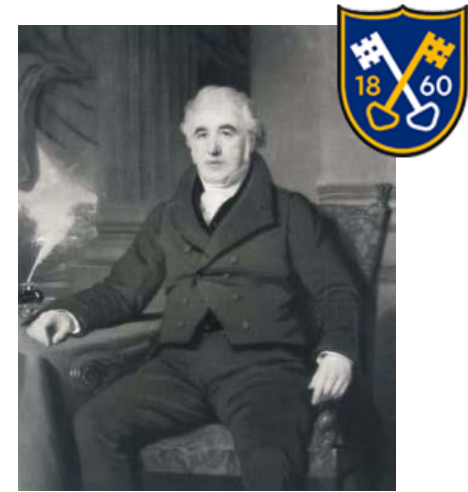
Why do we need new materials?



We can thank John Dunlop for our car and bicycle tyres!



John McAdam revolutionised our roads!



Charles Macintosh invented a waterproof fabric. We use it to make coats today!

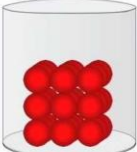
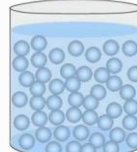
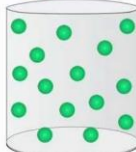
Key vocabulary

John McAdam	A Scottish engineer who used new materials to build roads.
John Dunlop	A Scottish inventor who invented the air-filled rubber tyre.
Charles Macintosh	A Scottish inventor who invented waterproof fabrics
Macadamisation	John McAdam's construction process of building roads..



Prior Learning (Year 2)	Local links	Unit Objectives
Lots of objects can be made from one material.  One object can be made from different materials.   Glass has been important to the people of St Helens for a very long time.	• The World of Glass • Glass making at Ravenhead and Knauf in St Helens • Glass futures research facility- St Helens 	Pupils should be taught to: ♣ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. ♣ perform simple tests to ascertain the rigidity, flexibility, absorbency, elasticity etc. of different materials, in order to suggest creative uses for them ♣ find out about people who have developed useful new materials (for example John Dunlop, Charles Macintosh or John McAdam). Where next? Is water always wet? (Year 4) 

Is form fixed? Is water always wet? (Year 4)

solid	liquid	gas
		
 rigid	 not rigid	 not rigid
 fixed shape	 no fixed shape	 no fixed shape
 fixed volume	 fixed volume	 no fixed volume
 cannot be squashed	 cannot be squashed	 can be squashed

Freezing- the change of a liquid into a solid. The atoms have 'frozen' (stopped moving)



When water **freezes**, it turns into ice.



When lava **freezes**, it turns into igneous rock.

Melting- the change of a solid into a liquid. The atoms have started moving past each other.



When ice **melts**, it turns into water.



We can **melt** metal, using extreme heat, before re-freezing it into different shapes and for different uses.

Evaporating- the change of a liquid into a gas. The atoms have gained enough energy to break apart from each other.



If we heat water over 100 degrees Celsius, it will **evaporate** and seemingly disappear.

Condensing the change of a gas into a liquid. The atoms have cooled enough (and so lost enough energy) to become attracted to each other again.



Clouds are actually liquid water that has **condensed** in the cold air. When the drops of water are heavy enough, they fall to Earth as rain.

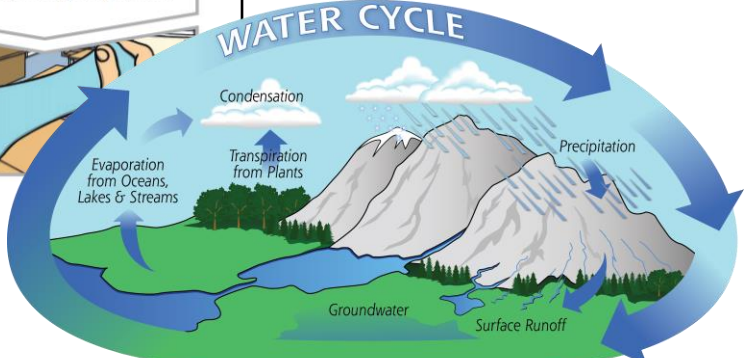
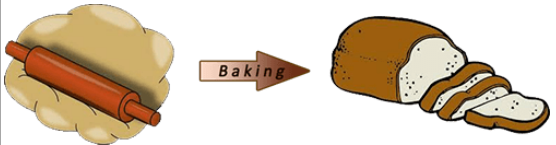
Key vocabulary

Liquid	A state of matter in which atoms flow freely past each other. Its shape is determined by the container it is in.
Solid	A state of matter that is firm and stable in shape. Atoms are fixed in place.
Gas	A state of matter that has no fixed shape and no fixed volume. Atoms can move freely.

Can I drink rain water? Why doesn't the pond in Willow Park evaporate away?





Prior Learning (Year 2)	Local links	Unit Objectives
We can thank John Dunlop for our car and bicycle tyres! Charles Macintosh invented a waterproof fabric. We use it to make coats today! John McAdam revolutionised our roads! Squash an object by pushing both hands together.  Bend an object by grabbing both ends of the object and bringing the ends inwards together.  Twist an object by turning your hands in opposite directions.  Stretch an object by pulling your hands slowly and gently apart.   WATER CYCLE Evaporation from Oceans, Lakes & Streams Transpiration from Plants Condensation Precipitation Groundwater Surface Runoff	• Melting and freezing sand to form glass in St Helens • How do local ponds, rivers and lakes feature in our local water cycle?	- Compare and group materials together, according to whether they are solids, liquids or gases - Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) - Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Where next? Can we change materials? (Year 5)  Baking

Is form fixed? Can we change materials? (Year 5)



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.



Baking



We create **irreversible changes** every in our kitchens.



We can create a new material called **casein plastic** by combining milk and vinegar. It can used to make buttons and toys.



We create all sorts of plastics using **irreversible changes**. We use plastic in many different ways every single day.

Key vocabulary

Chemical change	A chemical change happens when one chemical substance is transformed into one or more different substances, such as when iron becomes rust.
Substance	A particular kind of matter with uniform (the same) properties.
Reaction	A chemical process in which substances act on each other and are changed into different substances.
Rust	A reddish- or yellowish-brown flaking coating that is formed on iron or steel when the metal reacts with oxygen (especially in the presence of moisture).
Corrode	When metal, stone or other materials are destroyed or damaged by chemical action.
Compound	A substance formed when two or more elements react together.

How is our plastic use affecting our local and global environment?



Prior Learning (Year 4)	Local links	Unit Objectives
solid ● rigid ● fixed shape ● fixed volume cannot be squashed liquid ● not rigid ● no fixed shape ● fixed volume cannot be squashed gas ● not rigid ● no fixed shape ● no fixed volume can be squashed Freezing- the change of a liquid into a solid. The atoms 'frozen' (stopped moving) When water freezes, it turns into ice. When lava freezes, it turns into igneous rock.	• Catalyst Musuem, Widnes	Pupils should be taught to: ♣ explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. Where next? Pure and impure substances, and chemical reactions? (Key Stage 3)

**What natural objects
link science with history
and geography?**

1. Are all rocks the same? (Year 3)

What natural objects link science with history and geography? Are all rocks the same? (Year 3)



Types of Rocks

Igneous rocks



Igneous

- Formed from the solidification of molten rock (magma or lava).



topsoil

subsoil

bedrock

Sedimentary rocks



Sedimentary

- Formed at the Earth's surface from the accumulation and cementation of fragmented pieces of older rock produced by weathering.

Metamorphic rocks



Metamorphic

- Rocks that have undergone physical changes as a result of exposure to extreme pressure, temperature and fluids.

Did our local area always look like it does? Are there clues within our ground that tell us what life was like many years ago?

Key vocabulary

Magma	Molten rock that remains underground.
Lava	Molten rock that comes out of the ground.
sediment	Natural solid material that is moved and dropped off in a new place by water or wind.
Permeable	Allows liquids to pass through it.
impermeable	Does not allow liquids to pass through it.
Fossilisation	The process by which fossils are made.
Palaeontology	The study of fossils.
Erosion	When water, wind or ice wears away land.

Fossilisation

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.

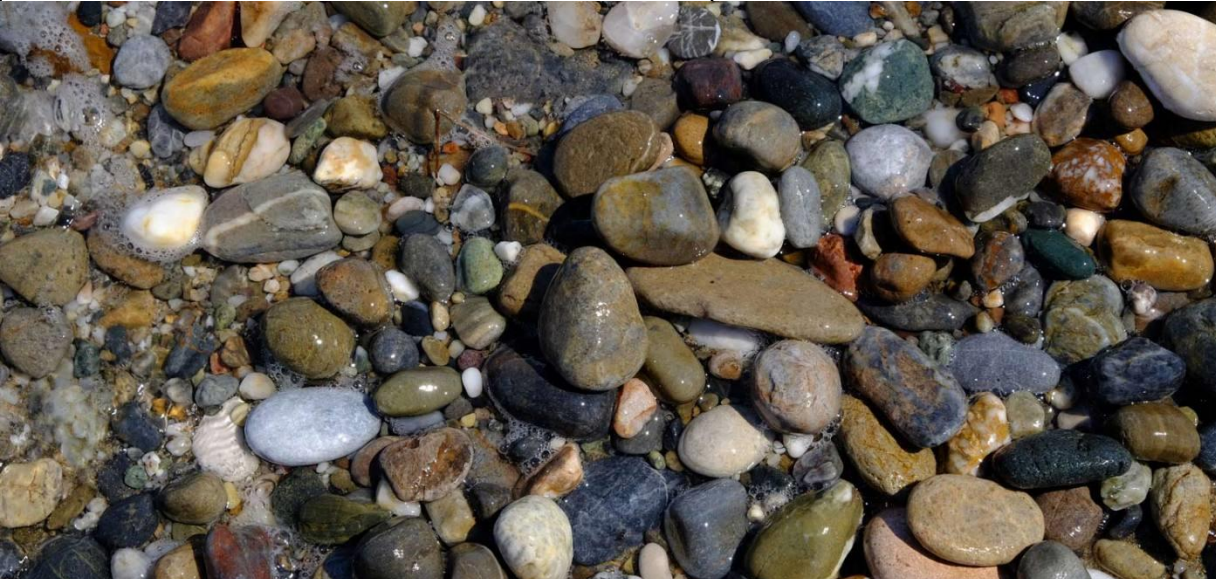
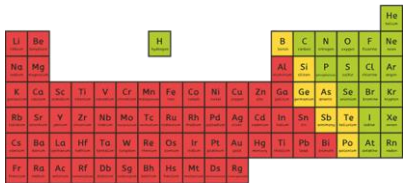
Over thousands of years, **sediment** might enter the mould to make a **cast fossil**. Bones may change to mineral but will stay the same shape.

Changes in sea level take place over a long period.

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





Prior Learning (Development matters/Year 1)	Local links	Unit Objectives
- Explore the natural world around them - Describe what they see, hear and feel - Describe the simple physical properties of a variety of everyday materials - Compare and group together a variety of everyday materials on the basis of their simple physical properties.	• What is the soil around Newton made of? • How has stone been used for building in Newton? • British Geological Survey-rock classification in your local area	- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties - Describe in simple terms how fossils are formed when things that have lived are trapped within rock - Recognise that soils are made from rocks and organic matter.
		Where next? The period table and the properties of elements? (Year 8) 

Can we see and
hear energy?

1. What is the dark?
(Year 3)
2. How do we hear
different sounds?
(Year 4)
3. How do we see?
(Year 6)

Can we see and hear energy? What is the dark? (Year 3)

In order to see, we need light from a light source.

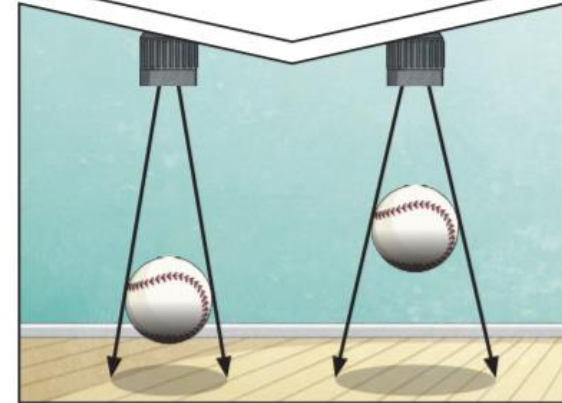


Light travels in straight lines.

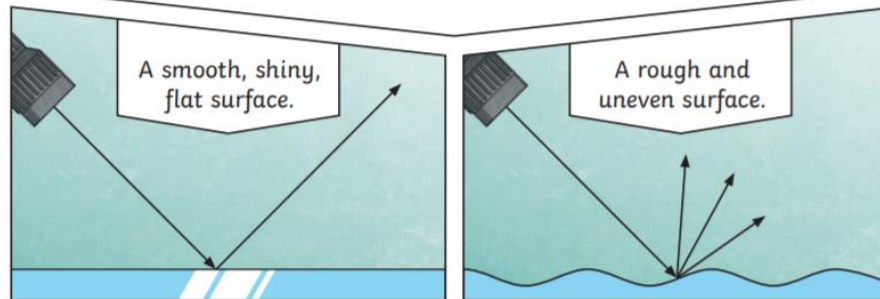
When it hits something, it can bounce off it. This is called **reflection**.



A **shadow** is caused when **light** is blocked by an **opaque** object. A **shadow** is larger when an object is closer to the **light** source. This is because it blocks more of the **light**.



The surfaces that reflect **light** best are smooth, shiny and flat.



The Sun is very dangerous and should never be looked at directly.



Why does the dark seem scary? Should it be?

Key vocabulary

Transparent	An object that lets light pass through it.
Translucent	An object that lets some light through but scatters the rest.
Opaque	An object that doesn't let any light through.

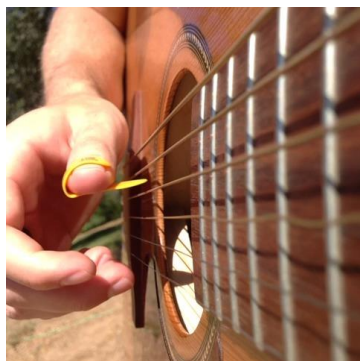
Key vocabulary

Light	A form of energy that travels in a wave from a source.
Light source	An object that makes light.
Dark	The absence of light.
Reflect	To bounce off
Reflection	When light bounces off an object and into our eyes.
Ray	Waves of light are called light rays.
Shadow	An area of darkness where light has been blocked.

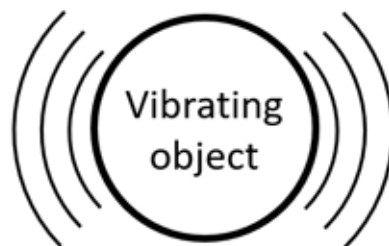


Prior Learning (EYFS)	Local links	Unit Objectives
Development Matters • Observe and interact with natural processes, such as light travelling through transparent material and an object casting a shadow	Glass production in St Helens (Ravenhead, Pilkingtons etc.) How did ancient cultures in Merseyside create and use mirrors? Are there any sun dials around St Helens?	Pupils should be taught to: • recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change.
		Where next? How do we hear different sounds? (Year 4) 

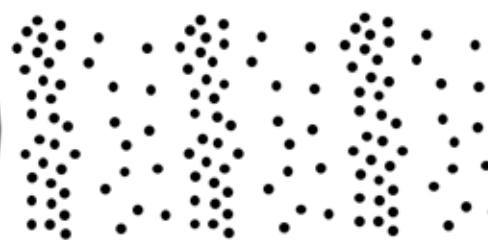
Can we see and hear energy? How do we hear different sounds? (Year 4)



When objects **vibrate**, they create sound energy.

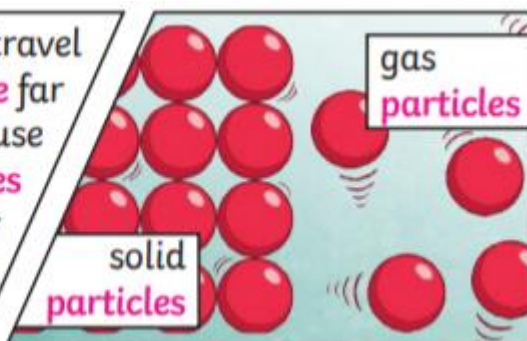


Vibrating air molecules

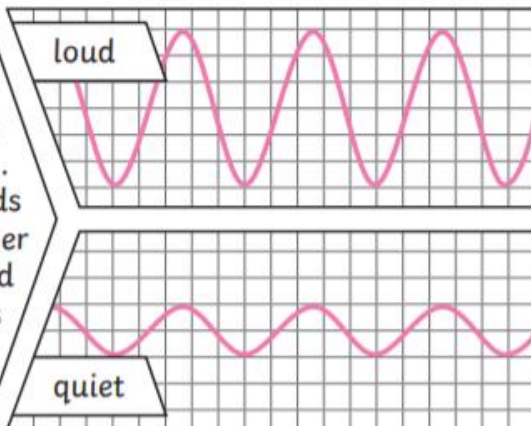


What is life like for people who are deaf?

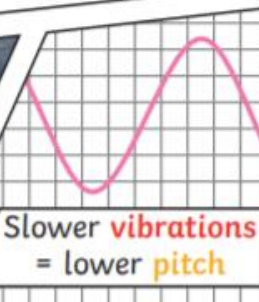
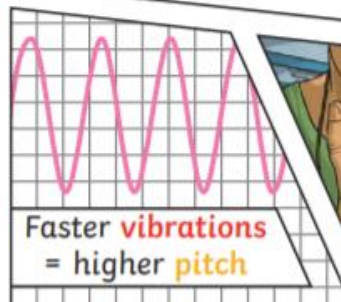
Sound energy can travel from **particle** to **particle** far easier in a solid because the **vibrating particles** are closer together than in other states of matter.



The size of the **vibration** is called the **amplitude**. Louder sounds have a larger **amplitude**, and quieter sounds have a smaller **amplitude**.



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





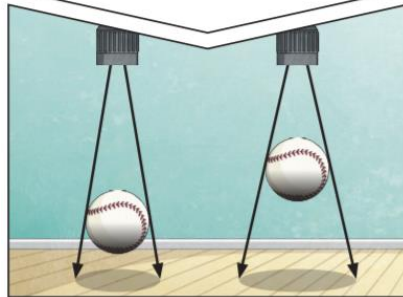
Prior Learning (Year 3)



Light travels in straight lines.

When it hits something, it can bounce off it. This is called **reflection**.

A **shadow** is caused when **light** is blocked by an **opaque** object. A **shadow** is larger when an object is closer to the **light** source. This is because it blocks more of the **light**.



Local links

St Helens Deafness Resources Centre



Inclusive design with deafness in mind



Unit Objectives

Pupils should be taught to:

- ♣ identify how sounds are made, associating some of them with something vibrating
- ♣ recognise that vibrations from sounds travel through a medium to the ear
- ♣ find patterns between the pitch of a sound and features of the object that produced it
- ♣ find patterns between the volume of a sound and the strength of the vibrations that produced it
- ♣ recognise that sounds get fainter as the distance from the sound source increases.

Where next?

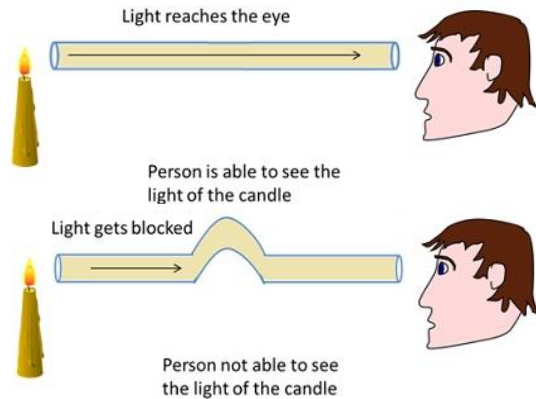
How do we see? (Year 6)

Why do we see colour?

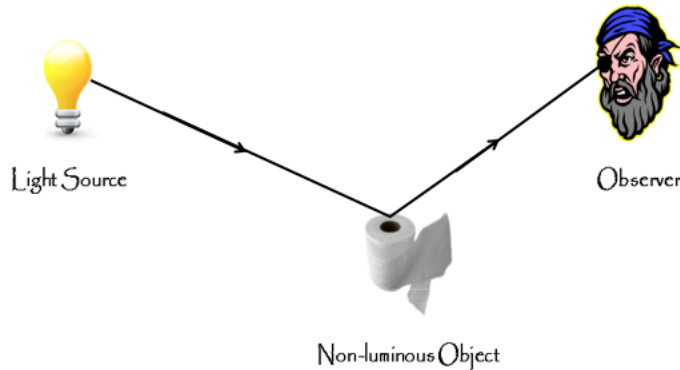


Can we see and hear energy? How do we see? (Year 6)

Light travels in straight lines.

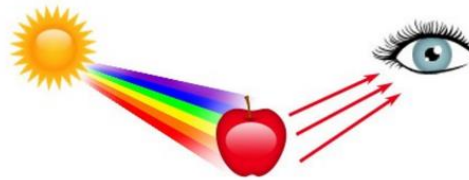


Light travels from a light source, reflects off of an object and travels into our eyes.



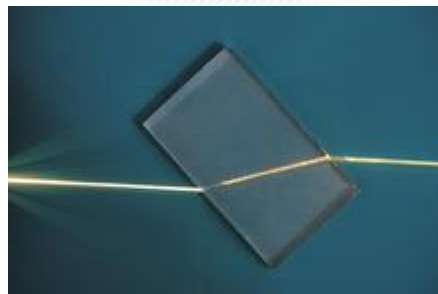
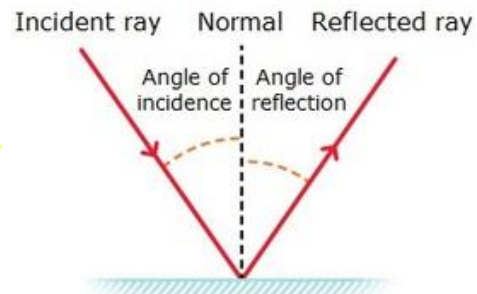
Look at the direction of the arrows.
We cannot shoot light rays out of our eyes!

Why do we see colour?

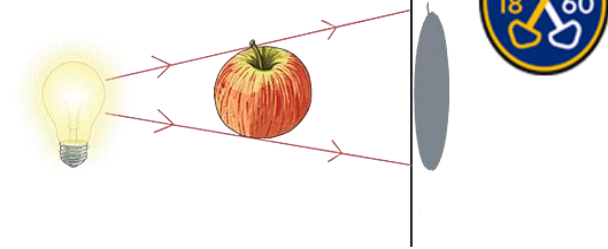


The apple looks red because only the red light is reflected. All other light is absorbed.

Mirror reflection



When light moves through objects, it can change direction. This is called **refraction**.



Shadows are formed when light is blocked by an opaque object.

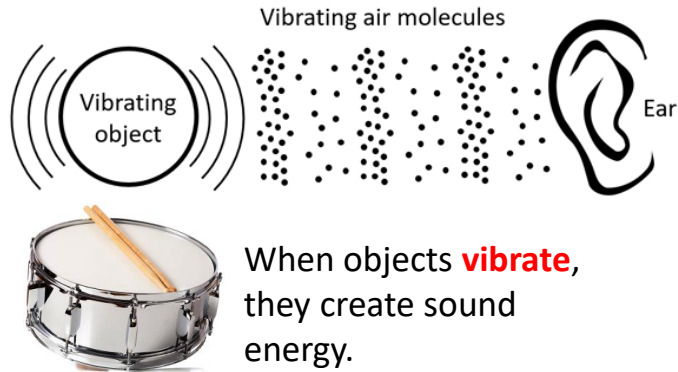
Key vocabulary

Light	A form of energy that travels in a wave from a source.
Light source	An object that makes its own light.
Ray	Waves of light are called light rays.
Incident ray	A ray of light that hits a surface.
Reflected ray	A ray of light that has bounced back after hitting a surface.
Absorb	Light is taken in by a surface and turned into heat energy.
Visible spectrum	Light that is visible to the human eye. It is made up of a colour spectrum.

What is life like for a blind person?



Prior Learning (Year 4)



Larger sounds have a larger **amplitude**,
softer sounds have a smaller **amplitude**.

Local links

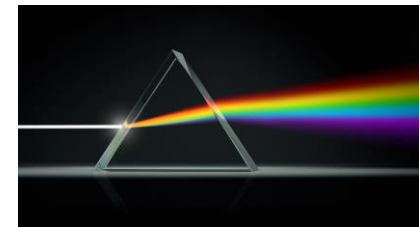
- There are lighthouses at Hoylake, New Brighton, Leasowe and Bidston
- The Sight loss Council supports blind people, alongside Galloways charity, in Greater Manchester and the North West.

Unit Objectives

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Where next?

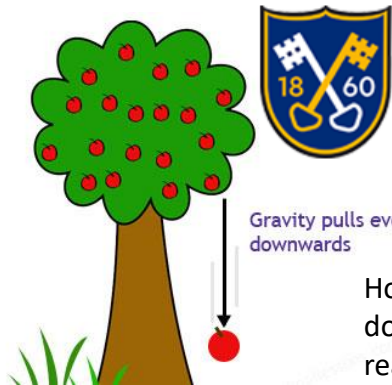
Light waves and how they move
(Secondary school- Key Stage 3)



How do things
move?

1. How do things
move? (Year 5)
2. Sun, Earth and
Moon: what's
moving? (Year 5)

How do things move? How do things move? (Year 5)



Gravity pulls everything downwards

However, downwards really means towards the centre of the Earth. This is why people in Australia don't fall off the planet!



We can show forces by drawing force arrows. The bigger the arrow, the bigger the force acting on an object! **These two arrows are the same size, so this man is neither speeding up or slowing down as he falls.**



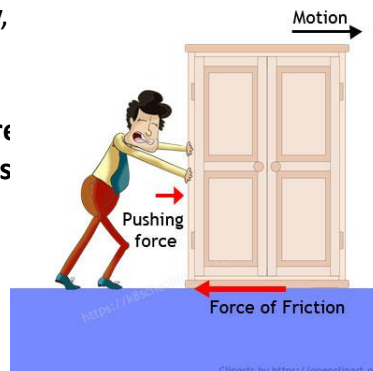
Air resistance

As gravity pulls the skydiver down, the particles underneath him push back. This is called air resistance.



Water resistance

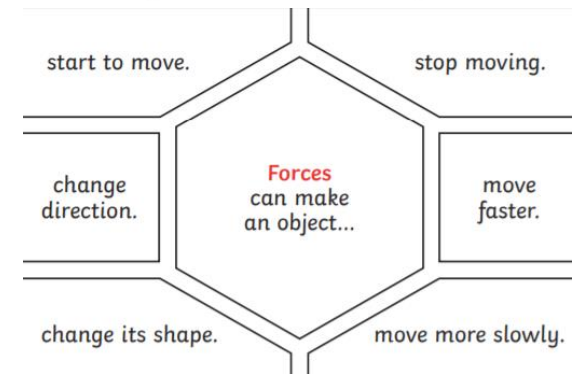
As the thrust of the boat engine drives it forward, the particles in the water are pushing back. This is called water resistance.



Friction

When two surfaces rub against each other, the force attempting to slow and stop the movement is called friction.

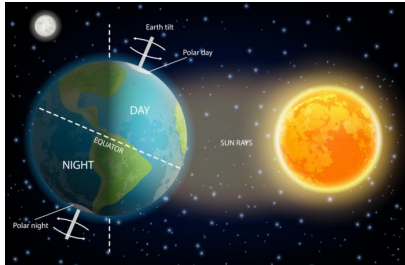
Pulleys	Gears/Cogs	Levers
Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight .	Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite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



Key vocabulary	
Forces	Pushes or pulls
Gravity	A pulling force exerted by the Earth.
Weight	The measure of the force of gravity on an object.
Mass	A measure of how much matter is inside an object.
Mechanism	Simple machines that change forces.

Who was Isaac Newton? Who was Archimedes?



Prior Learning (Year 3)	Local links	Unit Objectives
Forces- pushes or pulls Friction- a force that acts across the surfaces of two objects that are moving, or trying to move, across one another	- Parachute training at Tatton Hall in WWII - How are forces used at Oulton Park Race Track?	- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object - Identify the effects of air resistance, water resistance and friction, that act between moving surfaces - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
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.  Grass Gravel Sand Road		
		Where next? Sun, Moon and Earth- what's moving? (Year 5) 

How do things move? Sun, Moon and Earth- what's moving? (Year 5)



The Sun

All the planets (including Earth) are spheres.



Mercury Venus Earth Mars

Jupiter

Saturn

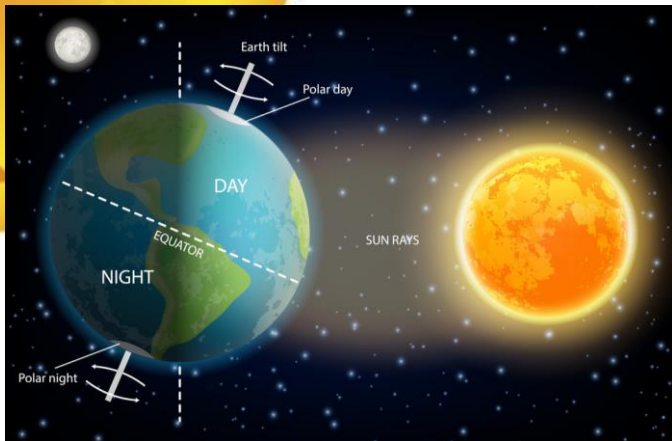
Uranus

Neptune

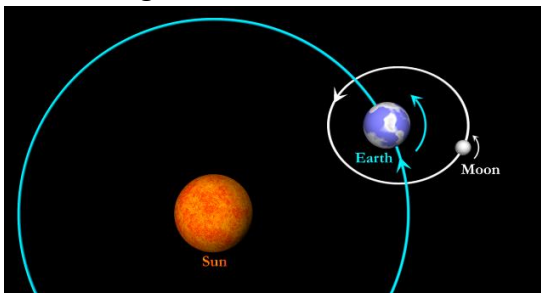
Rocky Planets

Gas Giants

All 8 planets (and Pluto, the dwarf planet) orbit the Sun. Each one is also rotating at the same time. This is called the 'Tusi Couple'.

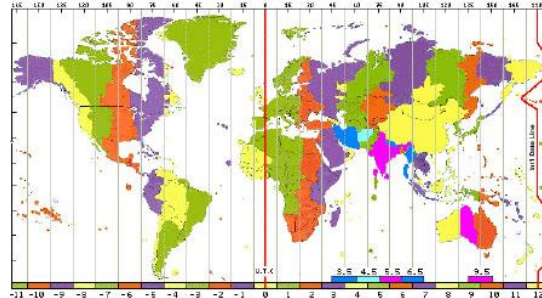


Because light travels in straight lines, only half of the Earth is lit at any one time. We call this half 'day'. The side in darkness is called 'night'.

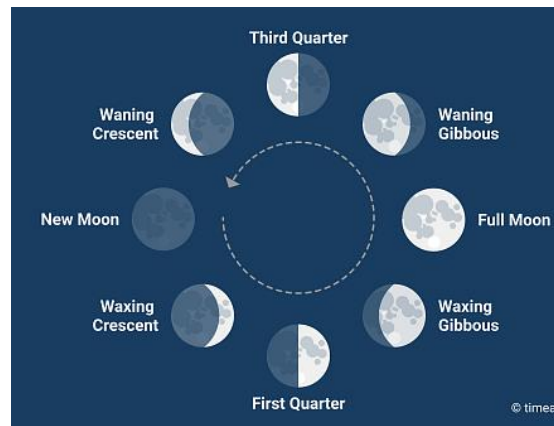


The Moon orbits the Earth as the Earth orbits the Sun.

We can use 'time zones' on a map to work out what time it will be on different parts of the globe.



Phases of the Moon



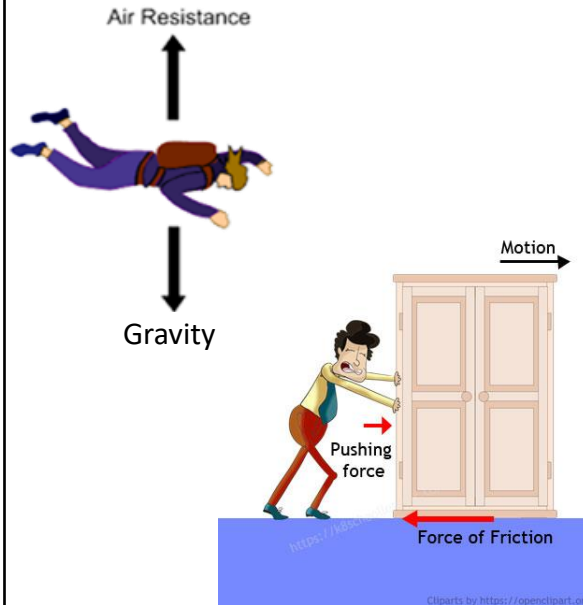
Key vocabulary

Star	A giant ball of gas held together by its own gravity.
Moon	A natural satellite which orbits Earth or other planets.
Planet	A large round object that orbits a star.
Sphere	A 3D shape in the shape of a ball.
Orbit	To move in a regular path around something
Rotate	To spin.
Geocentric model	A belief that people used to have that thought the Earth was the centre of the Solar System.
Heliocentric model	The correct structure of the Solar System, with the Sun in the centre.

Should we put people in danger to further science?



Prior Learning (Year 5)



Local links

- Jodrell Bank Discovery Centre



- Does the night sky in
Newton look the same as
the night sky in Australia?

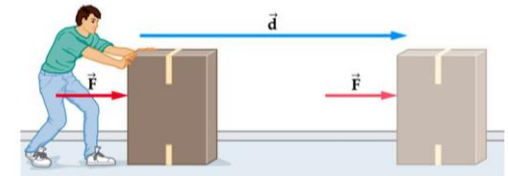


Unit Objectives

- ♣ describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- ♣ describe the movement of the Moon relative to the Earth
- ♣ describe the Sun, Earth and Moon as approximately spherical bodies
- ♣ use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
- ♣ describe the Sun as a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).
- ♣ understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).

Where next?

Gravity, mass and weight, *and* Constant forces (Key Stage 3)



**Can forces be
useful?**

1. What can magnets do? (Year 3)
2. Can we control electricity? (Year 4)
3. Can we vary the effects of electricity? (Year 6)

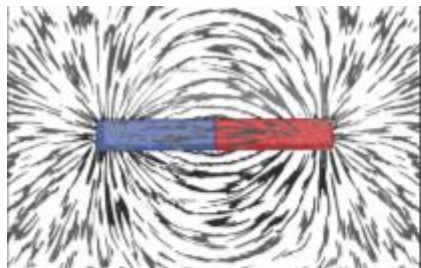
Can forces be useful? What can magnets do? (Year 3)

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.



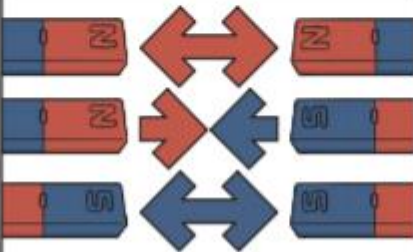
Friction pushes on the bicycle, slowing it down.



Like **poles** **repel**.
Opposite **poles** **attract**.



A **magnetic field** is invisible. You can see the **magnetic field** here though. This is what happens when iron filings are placed on top of a piece of paper with a **magnet** underneath.



The needle in a compass is a **magnet**. A compass always points north-south on Earth.

Magnetic ✓

These objects contain iron, nickel or cobalt. Not all metals are **magnetic**.

Non-magnetic ✗

These objects do not contain iron, nickel or cobalt.

Key vocabulary	
Forces	Pushes or pulls
Friction	A force that acts between two surfaces of objects that are moving, or trying to move, across each other.
Surface	To top layer of something.
Magnet	An object which produces a magnetic force.
Magnetic	Objects which are attracted to a magnet are magnetic.
Magnetic field	The area around a magnet where there is a magnetic force.
Poles	North and south poles are found at different ends of a magnet.
Repel	Repulsion is a force that pushes objects away.
Attract	Attraction is a force that pulls objects together.

How do magnets allow us to create and use compasses?





Prior Learning (Development matters)

I can talk about and explore the different forces I can feel (for example, how water pushes up when I push a boat down into it, and how magnets attract and repel different objects)



Local links

- How did magnets shape navigation, and so Merseyside?
- Merseyside Maritime Museum



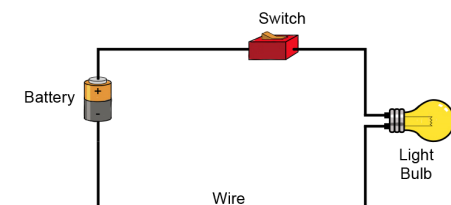
Unit Objectives

Pupils should be taught to:

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Where next?

Can we control electricity? (Year 4)



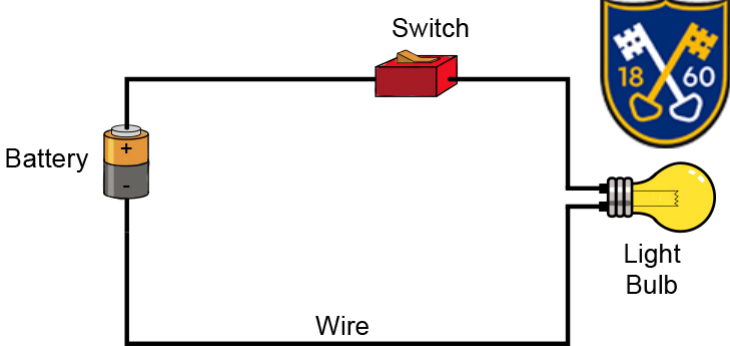
Can forces be useful? Can we control electricity? (Year 4)



All sorts of common appliances run on electricity! How many can you find?



Wires with crocodile clips.



For the bulb to light, the circuit must be complete (no holes) and there must be a power source (the cell or battery).



A cell.



Two or more cells make a battery.



A switch.



A bulb.

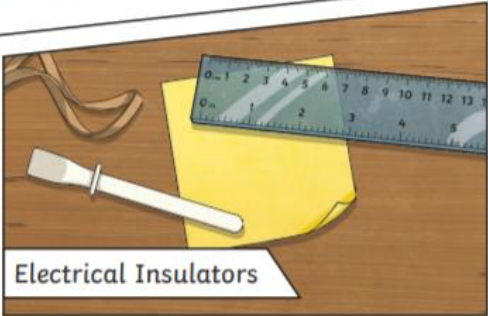


A buzzer.

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



Electrical Conductors

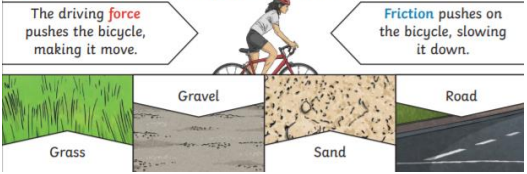
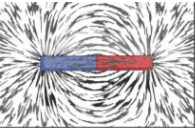
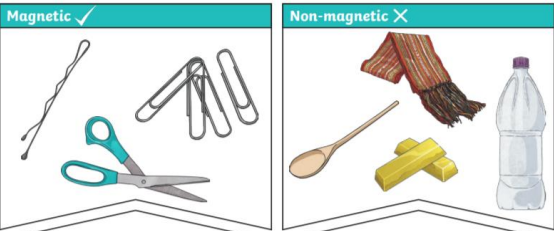
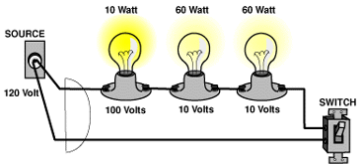


Electrical Insulators

Key vocabulary	
Electricity	The flow of an electric current through a material.
Generate	To make or produce.
Appliances	A piece of equipment or a device designed to perform a particular job.
Circuit	A pathway that electricity can flow around.
Renewable	A source of electricity that will not run out. These include solar, nuclear, geothermal, hydro and wind.
Non-renewable	This source of energy will eventually run out. These include fossil fuels- coal, oil and natural gas.

Why must we never touch mains electricity plugs and plug sockets?

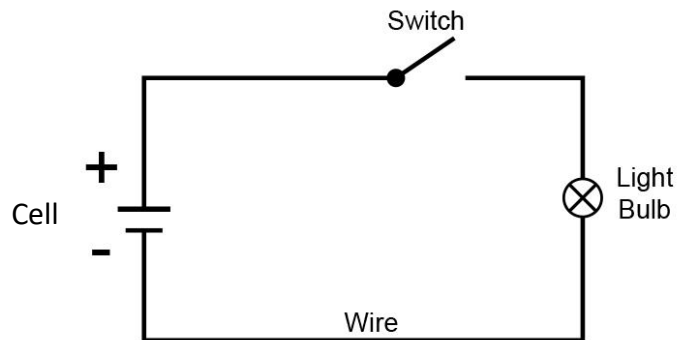
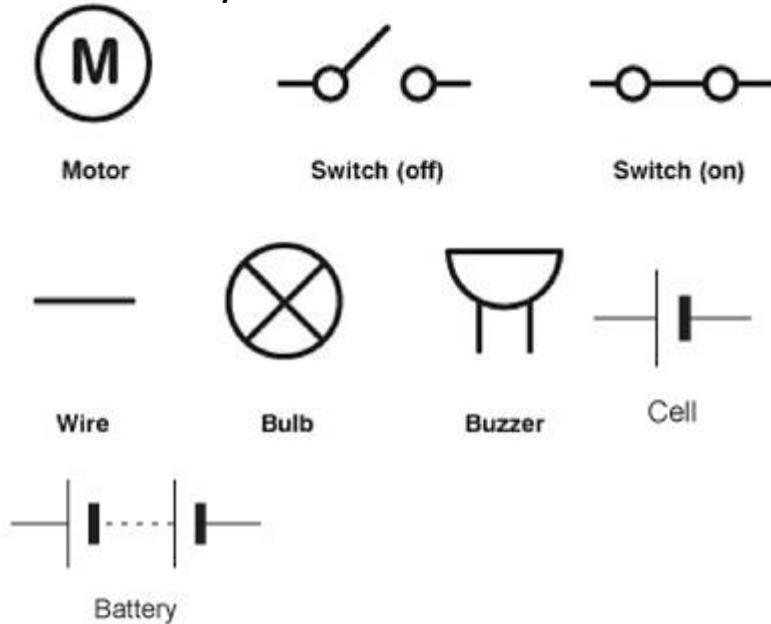


Prior Learning (Year 3)	Local links	Unit Objectives
Different surfaces create different amounts of friction. The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object, and the force between them. The driving force pushes the bicycle, making it move. Friction pushes on the bicycle, slowing it down.   Like poles repel. Opposite poles attract.  The needle in a compass is a magnet. A compass always points north-south on Earth. A magnetic field is invisible. You can see the magnetic field here though. This is what happens when iron filings are placed on top of a piece of paper with a magnet underneath.  Magnetic ✓ These objects contain iron, nickel or cobalt. Not all metals are magnetic. Non-magnetic ✗ These objects do not contain iron, nickel or cobalt.	How do we keep ourselves safe against accidents involving electricity? What safety features can we find around Newton that keep us safe from electricity? How does the power grid ensure all households get enough electricity? Where does our electricity come from? Fiddler's Ferry Power Station (now closed) Rocksavage Power Station (Runcorn)	Pupils should be taught to: ♣ identify common appliances that run on electricity ♣ construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers ♣ identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery ♣ recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit ♣ recognise some common conductors and insulators, and associate metals with being good conductors. Where next? Can we vary the effects of electricity? (Year 6) 

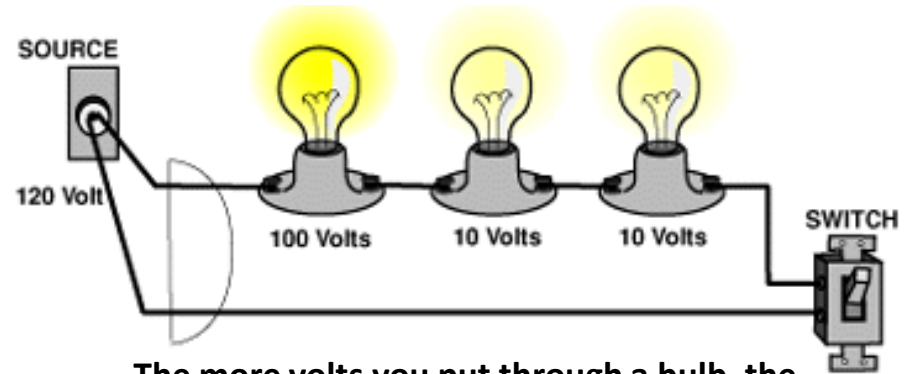


Can forces be useful? Can we vary the effects of electricity? (Year 6)

Circuit symbols



When the switch is closed, this bulb will light up. This is because the circuit is complete (no holes) and there is power source (cell).



The more volts you put through a bulb, the brighter it will be. You can buy batteries of different voltages at the shops.

Key vocabulary

Symbol	A visual picture that stands for something else.
Current	The flow of electrons, measured in amps.
Amp	How electric current is measured.
Voltage	The force that makes the electric current move through the wires. The greater the voltage, the more current will flow.
Resistance	The difficulty that the electric current has when flowing around a circuit.
Electrons	Very small particles that travel around an electrical circuit.

What are the dangers of high voltage?



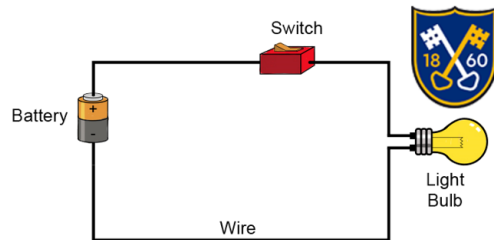
Prior Learning (Year 4)



A cell.



Two or more cells
make a battery.

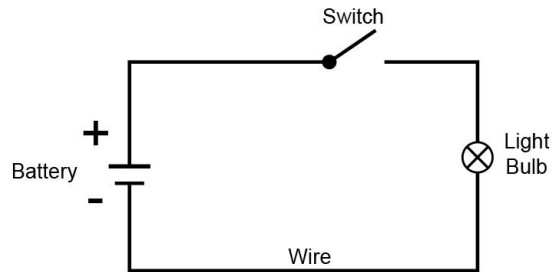


For the bulb to light, the circuit must be complete (no holes) and there must be a power source (the cell or battery).

Local links

KS2 electricity workshops
<http://www.ks2electricityscience.co.uk/>

How do we use electricity around school?



Unit Objectives

Pupils should be taught to:

- ♣ associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- ♣ compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- ♣ use recognised symbols when representing a simple circuit in a diagram.

Where next?

Current and static electricity (Key Stage 3)

