Knowledge Organiser Year 6
Unit: **Living Things and their habitats**

The six living kingdoms are: animals, plants, fungi, bacteria, protists and archaea.

Carl Linnaeus' book called 'Systema Naturae' laid out the classification of living things.

Fungi are their own kingdom as they gain energy from dead plants and animals, not the sun.

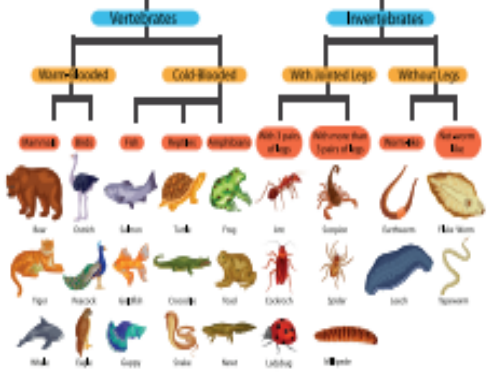
ROCKET WORDS
Learn these words and their definitions.

Key Word	Definition
classify	To organise by class, which is a group that has something in common.
prokaryote	A cellular organism which has no nuclear membrane.
species	The smallest class of organisms.
vertebrate	An animal with vertebrae – having a backbone or spinal column.
invertebrate	An animal without a backbone or spinal column.
microorganism	A tiny, microscopic organism such as bacteria, virus or fungus.
fungi	A diverse kingdom which includes mushrooms to brewer's yeasts.
kingdom	A category grouping together all forms of life, having certain characteristics in common.

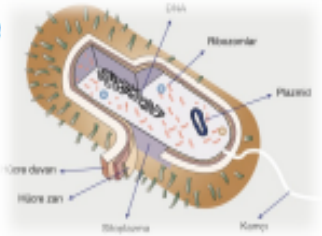
MRSGREN : Processes

Movement
Respiration
Sensitivity
Growth
Reproduction
Excretion
Nutrition

Classification



Prokaryote Cell



FACTOIDS:
Can you find out more?

Q1. What is soil a habitat to?
A1. Soil mainly contains micro-organisms, of which there are billions.

Q2. What is an ecosystem?
A community of interactive living things which rely on each other to live and grow.

Q3. What does Homo Sapiens mean?
Home is the Latin word for man and sapiens means wise.

Lesson Sequence

1. Classify living things
2. Explore the kingdoms of life
3. Describe the work of Carl Linnaeus
4. Identify different classes of vertebrates
5. Explore soil habitats
6. Describe different types of fungi and yeast

Unit: Living Things and their Habitats

This unit is designed to help you understand the way living things are classified and how they interact with each other for survival. You can learn about how to think about different living things by the mnemonic MRSGREN. This unit can also help you think about the importance of habitats and how we should help conserve them.
Many jobs require an understanding of classification, anatomy and habitat, such as vets, doctors, environmentalists and scientific researchers. In any case, we rely on the animal and plant kingdoms to survive, so it's best we know how to conserve them!

Developing Experts

Knowledge Organiser: Year 6 – Animals, including humans

Lesson Sequence

1. Understand the function of the heart and its role in the circulatory system

2. Identify and compare blood vessels

3. Explore blood

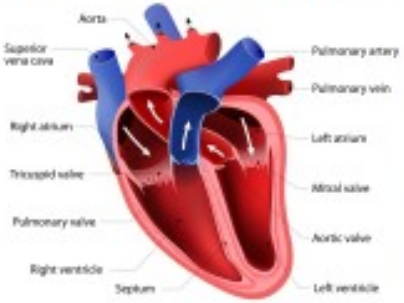
4. Learn how the body transports water and nutrients

5. Investigate what affects your heart rate

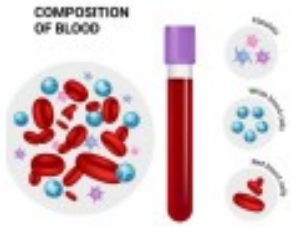
6. Learn about the impact of drugs and alcohol on the body

The Heart

The **heart** pumps **blood**, carrying nutrients and oxygen, around every part of the body.



The red vessels are **arteries** and the blue vessels are **veins**. **Arteries** have thick, muscular walls and carry **oxygenated** blood from the **heart** to the rest of the body. **Veins** carry **deoxygenated** blood back to the heart and have thinner walls. **Capillaries** are microscopic vessels which link the veins and arteries together.



Red blood cells carry **oxygen**.
White blood cells fight infection as part of the immune system.
Platelets help to clot (thicken) the blood and form a scab.
Plasma is the fluid part of the blood, which transports

Looking After Our Heart

Healthy Food Pyramid

To keep our **heart** and body healthy, we need to:

- eat a balanced diet (not too much sugar or fat);
- exercise regularly;
- drink approximately 2 litres of water a day;
- limit alcohol intake, in adults;
- get approximately 8 hours of sleep.

Drugs, including alcohol, can cause liver damage, poor sleep, high blood pressure, and different types of cancer. Drugs can be classified into four groups – painkillers, stimulants, depressants and hallucinogens.

Knowledge Organiser Year 6
Unit: Evolution and Inheritance

Humans are 99.9% all the same, but the other 0.1% contains enough DNA information to make us all different!

Some animals are bred to make products and others for scientific research.

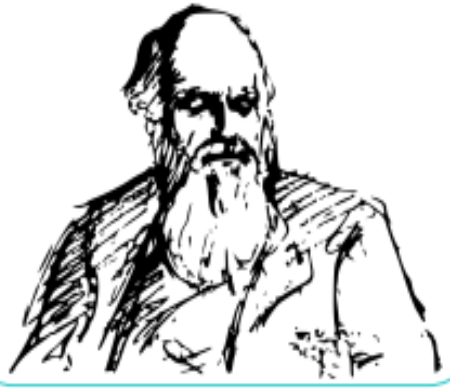
Animals can also be bred for cultural or ethical reasons, or to be kept as pets.

ROCKET WORDS
Learn these words and their definitions.

Key Word	Definition
evolution	A process of formation, growth or development.
inheritance	A quality, characteristic or trait which is passed down generations.
DNA	The material in chromosomes that transfers genetic information in all life forms (Deoxyribonucleic acid).
natural selection	Coined by Charles Darwin, it means the survival and reproduction of the fittest species.
ancestor	A person from whom one is descended.
husbandry	The care, cultivation and breeding of crops and animals.
generation	A group of individuals belonging together at the same time period.
fossilisation	The process of an animal or plant being turned to stone.

Charles Darwin and Natural Selection

- Different species of animal had evolved from one shared ancestor.
- Animals had adapted to suit the habitats and environments they live in.
- Those animals that didn't adapt had become extinct. Called the 'Survival of the Fittest.'
- Many religious people were angry at his theory to start with.



Genetic Modification

Pros	Cons
• Can protect crops and mean the produce has less disease. • The produce can be bigger and tastier • Can mean lower cost to consumer.	• We don't know the long-term effects of safety • Research isn't yet finished • Could cause more allergies or diseases for consumers

FACTOIDS:
Can you find out more?

Q1. What is a GM crop?
A1. This means 'genetically modified' and is one which scientists have altered to protect against disease.

Q2. Who was Mary Anning?
A famous palaeontologist who discovered lots of fossils.

Q3. What are fossils?
Casts of dead organisms who were alive millions of years ago.

Lesson Sequence

1. Explain how adaptations help animals and plants survive


2. Describe the process of natural selection


3. Explain why animals can look different to their parents


4. Describe the process of genetic modification


5. Explain what fossils can tell us


6. Explore the work of palaeontologist Mary Anning

Unit: Evolution and Inheritance
This unit is designed to help you learn about the history of organisms (animals and plants) and how they need to adapt to survive. From Darwin's theory of natural selection, to genetic modification and cloning today, you will gain an understanding of how inheritance and genetics works.
You will also gain an understanding of what history tells us, such as fossils and geology. It really is a fascinating subject to see how life on earth has evolved over all these years!

Developing Experts™

Knowledge Organiser: Year 6 Light

Careers connected to Light: Photonics, Lighting technician, Optometrist, Photographic Processor

Lesson Sequence

1. Explore how light travels

2. Explore reflection

3. Explore reflection and explain how it can be used to help see things

4. Investigate how shadows can change

5. Investigate how we can show why shadows have the same shape as the object that cast them

6. Explore light phenomena

How We See

Light travels in **straight lines**.
The light rays from a light source reflect off the object we are looking at. The light travels in a **straight line** and enters the eye through our pupil.

Bending Light

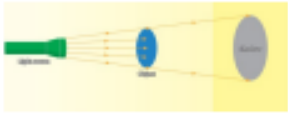
Reflection

Light reflects off shiny, bright or light surfaces. That is why you can see your reflection when you look in a mirror.

Refraction

Water and bent shiny surfaces cause light rays to be reflected at different angles, meaning the reflection of the image is distorted.

Shadows



Opaque objects block the light rays so they can only travel around the edges of the object in straight lines. That is why a shadow is the same shape as the object.

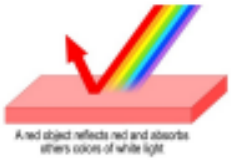
The closer an object is to the light source, the bigger the shadow.

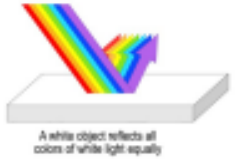
The further away the object is from the shadow, the smaller the shadow.

Colours

White light is made up of the colours of the rainbow. When light is refracted through a transparent object, a rainbow is formed.

Absorption and reflection of light



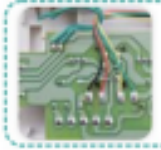


Knowledge Organiser: Year 6 Electricity

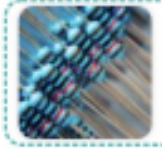
Careers connected to electricity: mechanical engineering technician, electricity distribution worker, electrical engineer, energy engineer.

Lesson Sequence

1. Describe the parts of an electric circuit



2. Explore voltage and its effect on an electrical circuit



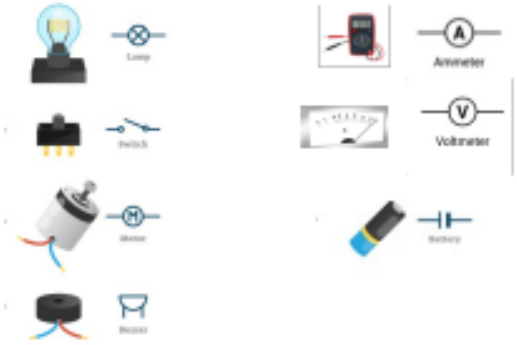
3. Apply knowledge to identify and correct problems in a circuit

4. Investigate what affects the output of a circuit

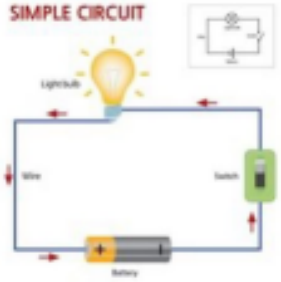
5. Build a set of traffic lights

6. Apply knowledge of conductors and insulators

Circuit Symbols

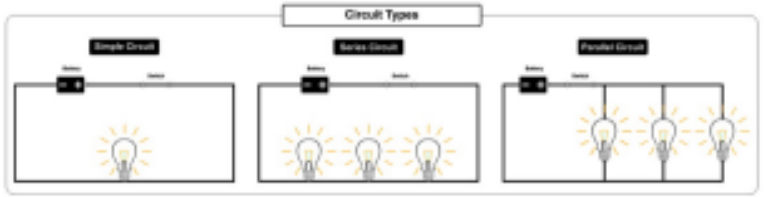


Wires are always drawn with a **straight line** using a **ruler** in scientific diagrams.

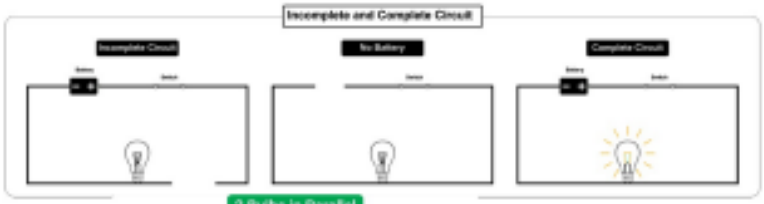


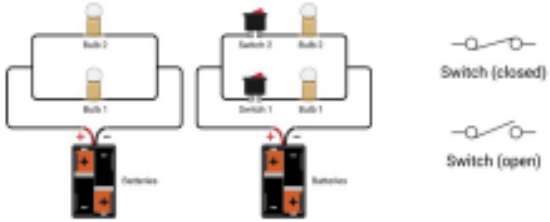
The **current** flows from negative to positive. There are no gaps so it is a **complete** circuit and the bulb lights up.

Different Circuits



Adding more cells (batteries) to a circuit will make bulbs **brighter**, buzzers **louder** and motors **faster**.





Switches can be placed in a **parallel circuit**, so that 1 light can be turned on while another is off (just like in a house).

Knowledge Organiser: **Looking after our Environment**

Careers Explored:

ROCKET WORDS
Learn these words and their definitions.

Key Word	Definition
natural	Something which originates or exists within nature and is not man-made.
synthetic	An item which is made through a chemical synthesis and is a man-made product instead of being created naturally.
landfill	A site which is used to dispose of waste which cannot be recycled.
sustainable	Something that is able to be grown and maintained at a set level.
resources	An amount of a specific material or item which can be used.
life cycle	A sequence of alterations which something goes through over its life time.
raw material	The resources which a product is made from.
emissions	When particles and gases are put into the air.
greenhouse gas	A gas which adds to the greenhouse effect by taking in infrared radiation, an example of this is carbon dioxide.

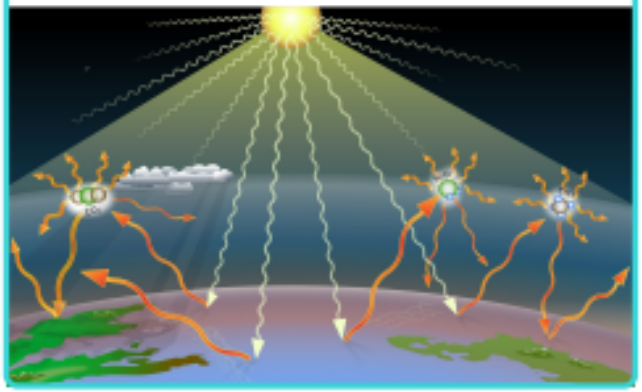
Natural Materials

water
cotton
wheat
sand
clay wood

Synthetic Materials

plastic
glass
concrete
metal nylon

Greenhouse gases are **gases in Earth's atmosphere that trap heat**. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere.



Reduce stands for reducing the amount of waste produced. This is achieved by avoiding disposable items. Keeping our new purchases.

Reuse means using items that can be reused. For example, paper plates cannot be reused. When we reuse something it reduces the waste placed in the landfill sites.

Recycle is how we take rubbish and transform it into new products. Recycling is important to preserve the environment.

Climate change is a change in the usual weather found in a place. This could be a change in how much rain a place usually gets in a year. Or it could be a change in a place's usual temperature for a month or season.
Climate change is also a change in Earth's climate. This could be a change in Earth's usual temperature. Or it could be a change in where rain and snow usually fall on Earth.

Lesson Sequence

1. Explore what everyday materials are made from

2. Understand why recycling is important

3. Know about the life cycle assessment

4. Explore what happens when fuels are burnt

5. Understand global warming

6. Learn about climate change