

SCIENCE
SUMMER
KNOWLEDGE
ORGANISERS



Y5 SCIENCE KNOWLEDGE ORGANISER

TOPIC: Unit 4 [SPRING / SUMMER]



The force of friction is opposite the direction of motion

Friction is the force that pushes against objects as they move along a surface to slow you down

More friction means more grip

Rougher surfaces have more friction

Air resistance and Water resistance are special types of friction where air or water push against objects to slow them down. They are also known as **drag**.

Air resistance

Water resistance

Levers, Gears and Pulleys are simple machines that turn a small force at a distance into a greater force around a pivot point.

PULLEY

GEARS

LEVER

Plant life cycle

Seed dispersal → Germination → Growth → Pollination → Fertilisation and Seed creation

Seeds need water and warmth to germinate. They don't need light.

The roots always grow first to find water.

What do plants need to be healthy?

LIGHT – to make food

AIR – to make food

WATER – to make food

WARMTH – to grow well

NUTRIENTS – to stay healthy

Flower Parts

The **stigma** is sticky to keep hold of the pollen.

The **petals** attract insects.

The **anther** is the part that makes the pollen.

The **style** supports the stigma and connects it to the ovary.

The **filament** holds up the anther.

The **ovary** is where the ovules, or eggs, are.

The **sepal** leaves protect the flower before it opens.

Pollination

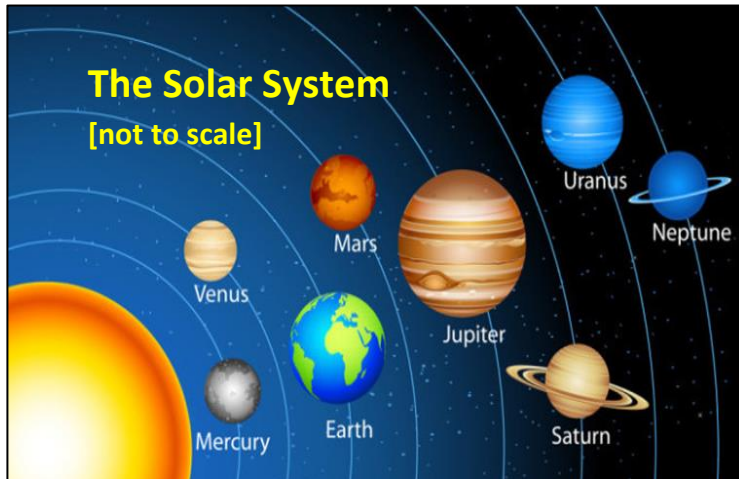
This is transfer of pollen from one plant to another

Fertilisation

This is joining of an egg cell and pollen grain to form a seed. The ovary turns into the fruit

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UNIT 5 [SUMMER]



Key Vocabulary	Definition
Solar System	The group of planets that orbit our Sun: Mercury, Venus, Earth and Mars are all rocky planets, Jupiter, Saturn, Uranus and Neptune are all gas giants. Pluto is too small to be classed as a planet.
Eclipse	Where the light from the Sun is blocked out by the moon, when the two bodies exactly line up. These are rare.
Heliocentric	This means 'sun in the centre'. This idea was developed by Galileo, then Copernicus when they observed space with telescopes. For many years, Earth was said to be the centre of space.

Food facts

But what types of foods do our bodies need?

The body uses different types of food to:

grow and repair create energy for activity, and to keep healthy.



These contain protein



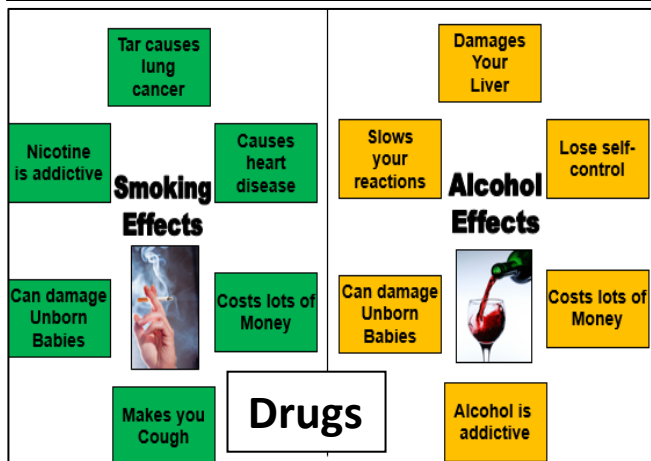
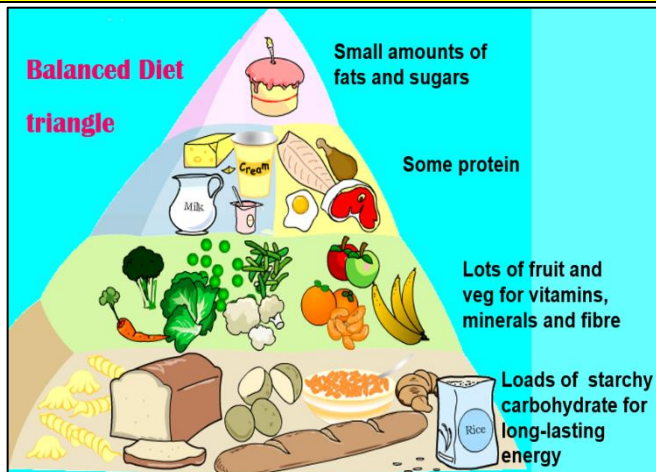
These contain fat or carbohydrates like sugar or starch



These contain fibre, water, vitamins and minerals

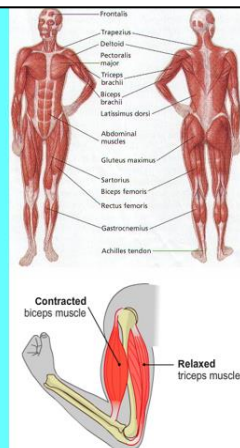
How do we maintain a healthy lifestyle?

- Exercise regularly
 - 30 min a day
- Eat a balanced diet
 - Look at the food pyramid
 - 7-a-day
- Eat the right amount of food
 - Affects your weight
- Don't take harmful drugs
 - Damages your organs
- Get enough sleep
 - 8 hours per day
- Be hygienic
 - Wash and clean teeth
- Drink lots of water
 - 1.5 litres every day



Muscles!

- They can only pull your bones in one direction
 - This is called contracting.
- They can't push, but just relax when not pulling
- Muscles often work in pairs that pull in opposite directions
 - These are called antagonistic [means 'against']
- There are some muscles you don't control like in your stomach and heart



What does the skeleton do?

- It protects your important organs
- It allows you to move [along with muscles]
- It stop your body from collapsing



How can we look after our skeleton?



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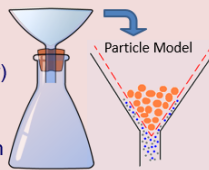
TOPIC: Unit 4 [Spring]



How are solids separated out of mixtures?

Separating an **insoluble solid** and a liquid:

- If a solid is insoluble (e.g. sand in water) then it is easy to separate it by **filtering** the mixture.
- The insoluble solid cannot pass through the filter paper but the water can.



Separating a **soluble solid** and a liquid:

- To separate a soluble solid from a liquid (e.g. salt and water), **evaporation** can be used.
- The solution is heated so that the water evaporates and leaves the dissolved solid behind.



Reversible	Irreversible
Evaporating Freezing Dissolving Mixing cement	Cooking an egg Burning
Changes that can be done backwards	Changes that cannot be done backwards

Key Vocabulary	Definition
Inherit	Receive information from the previous generation. In most animals, this information is passed on in the egg from the mother and the sperm from the father.
Variation	The differences between living things
Fossil	An imprint of a living thing from millions of years found in rock. A living thing dies, gets buried by many layers of sediment, and eventually the hard parts [bones etc.] turn into minerals
Human Impact	The activities by human beings can have a dramatic effect on the habitats of other living things. Pollution and global warming are destroying many natural habitats .
Charles Darwin	Famous scientist who came up with the theory of Evolution. He first described the process of Natural Selection.
Reversible Change	A change to a material that can be done backwards. All changes of state [like melting and condensing] are reversible. Dissolving and mixing are also reversible.
Irreversible Change	A change to a material that cannot be done backwards. They always make a brand new material. Burning, cooking and making plaster are good examples.
Mixture	Materials that are jumbled up together but can be separated.
Separation	The way that mixtures can be split up into the parts that make them up. Examples include sieving, filtering, magnetism and evaporation.

How fossils form

Organism Dies

Buried quickly by sediments

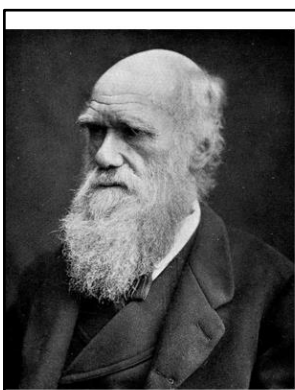
The body rots away and minerals replace the bones. Over millions of years, it turns to rock.

Rocks are moved up by the Earth, and the fossil gets exposed

Scientists can use fossils to learn lots about the living things that lived in the past.

We call the information gained from fossils the **Fossil Record**.

Not all living things fossilise well, and there will be many fossils that have been **destroyed** by the movements of the Earth, or **simply not yet been discovered**. This means we have gaps in the Fossil Record.



The modern ideas on **evolution** were created by **Charles Darwin** in his 1859 book 'The Origin of Species'.

Evolution

- 1) Animals of the same types are similar but have differences [variations]. Some are helpful.
- 2) There is competition within each species for food, living space, water, mates etc., and the risk from predators and disease.
- 3) The "better adapted" members of these species are more likely to survive - this is called "Survival of the Fittest" or Natural selection.
- 4) These survivors will pass on their better genes to their offspring who will also show this beneficial variation. This continues for many generations.
- 5) Over millions of years, animals change for the better. This is **evolution!**

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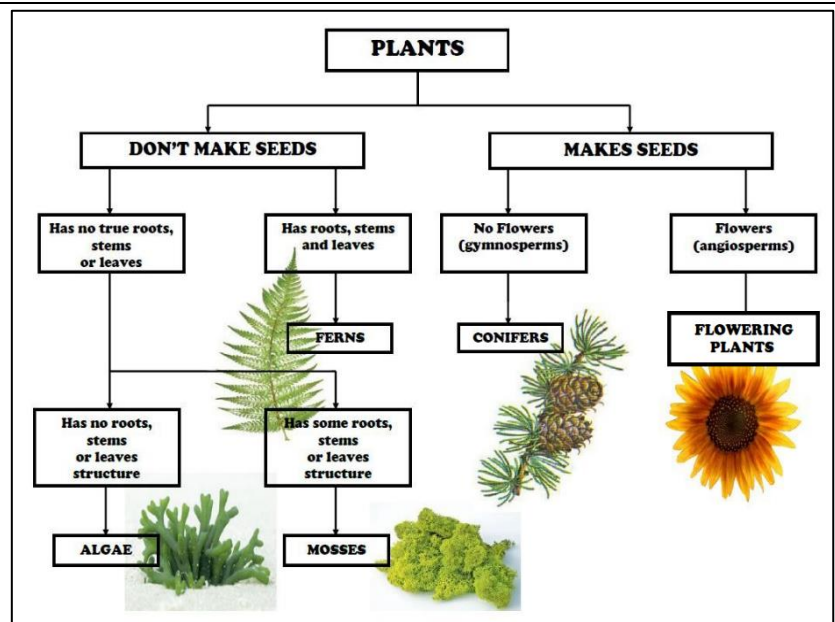
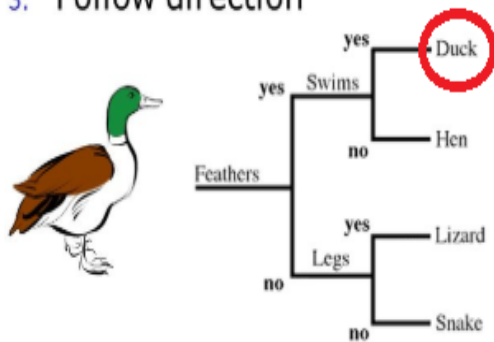
TOPIC: Unit 5 [SUMMER]



Key Vocabulary	Definition
Circuit	A complete loop that electricity can flow around. Any breaks in the circuit will stop the electricity from flowing.
Voltage	The amount of electrical energy. It gets used up in a circuit, which is why batteries go flat. More cells mean more voltage! Bigger cells mean usually have a higher voltage.
Classify	Put things into groups based on similarities and differences
Key	A scientific device that use differences to identify and separate objects or living things
Variation	The differences between living things
Micro-organism [microbes]	Very small living things. Types are Fungi, Viruses and Bacteria. Microbes grow best when the conditions are warm and moist.
Hygiene	Methods used to stop the spread of microbes

HOW TO USE A KEY

- Look at the statement / question
- Select either (a) or (b)
 - Which describes the organism?
- Follow direction



Circuits can be really useful!

Simple traffic lights

Each bulb needs to be **turned on and off** separately.

To do this we have **three separate parts** in our circuit where **each bulb** has its **own switch** to control it.

Micro-organism

[Very Small] [Living Thing]

<u>Harmful Micro-organisms</u> Illnesses Rotting food Mould Infection and Spots Plaque - Tooth Decay	<u>Useful Micro-organisms</u> Food Production - Cheese, Bread, Yoghurt Alcohol Production - Beer and Wine Compost & Decay Cleaning Sewage Antibiotics
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Bulbs are **dimmer**

Bulbs are **brighter**

The **higher** the number of **cells** in a circuit, the **brighter** the bulbs are

Bulb is **brighter**

Bulbs are **dimmer**

The **higher** the number of **bulbs** in a circuit, the **dimmer** the bulbs are

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UNIT 4 [Spring / Summer]



Reversible	Types Of Change	Irreversible
Temporary		Permanent
Physical change - No new material [same particles]		Chemical Reaction – New material [particles rearranged]

How can we show reactions?

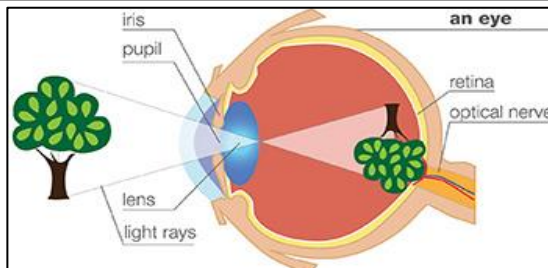
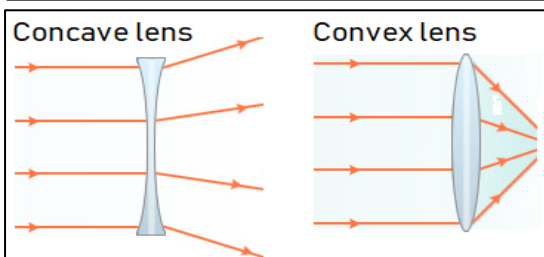
Word Equation:

Iron + Sulphur → Iron Sulphide
[Reactants] [Products]

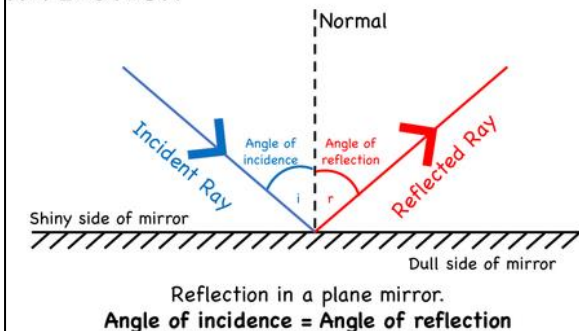
Symbol Equation:

Fe + S → FeS

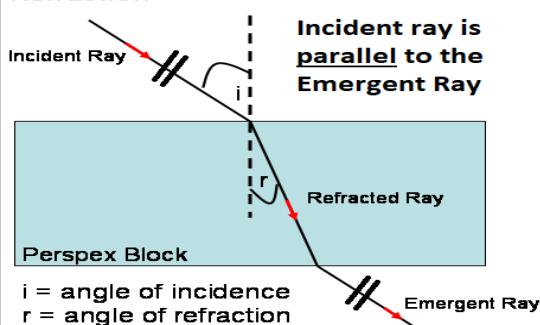
- FeS is the **Chemical Formula** for Iron Sulphide



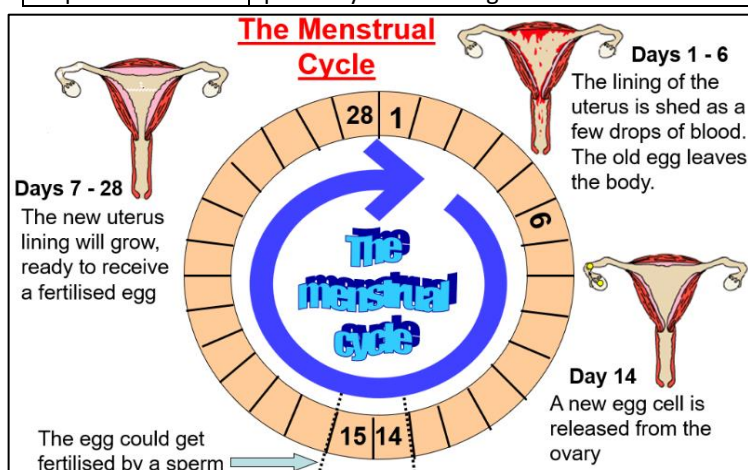
REFLECTION



Refraction



Key Vocabulary	Definition
Chemical Reaction	An irreversible change where particles change order and combination. A physical change does not change the order and combination of atoms, and can usually be easily reversed. Mass is not lost or gained in reactions.
Oxidation	The chemical reaction where oxygen combines with another element to form an oxide. Rusting is an example.
Reflection	When light off an object. The angle of incidence is always the same as the angle of incidence.
Refraction	The change in direction of light as it travels into a new transparent material, such as glass or water.
Scatter	When light reflects off an uneven surface in many directions
Normal	The line draw at 90° to the reflecting surface
Contraception	Methods used to prevent egg and sperm from joining. Some are physical like a condom, and some are chemical, like the contraceptive pill
IVF	In-vitro Fertilisation – where fertilisation is performed outside of the body using removed eggs and sperm.
Contractions	Muscular movements from the uterus which push the baby out when it is being born
Asexual Reproduction	Reproduction methods where living things create exact copies of themselves without the need for a mate. Used primarily in micro-organisms.



Pregnancy

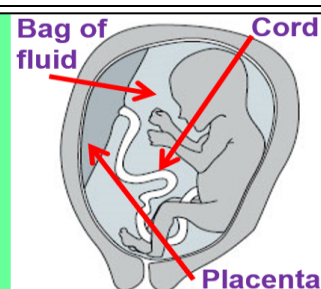
An embryo forms a structure called the **placenta**, which attaches to the uterus wall.

The **umbilical cord** joins the foetus [developing baby] to the placenta.

In the placenta, food and oxygen diffuse from the mother's blood into the blood of the foetus.

Carbon dioxide and waste products diffuse from the blood of the foetus into the mother's blood.

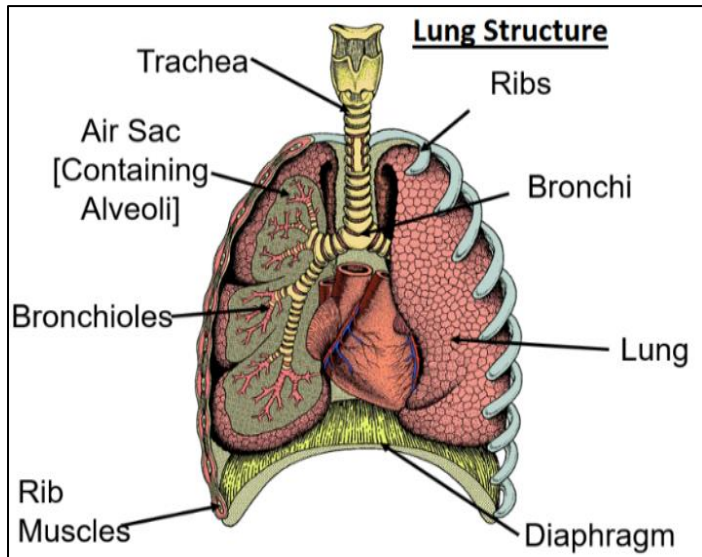
The foetus is protected inside the uterus by a **bag of spongy liquid [amnion]**



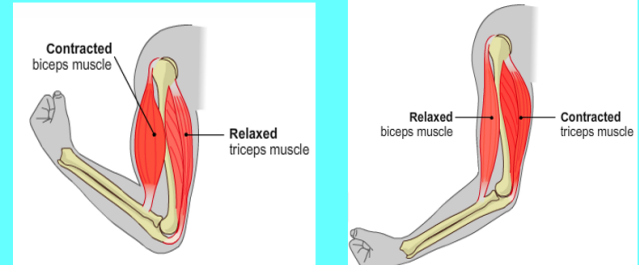
A mother has to be careful about what she takes into her body. **Alcohol and other drugs** can pass through the placenta and damage the foetus.

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TOPIC: UNIT 5 [Summer]

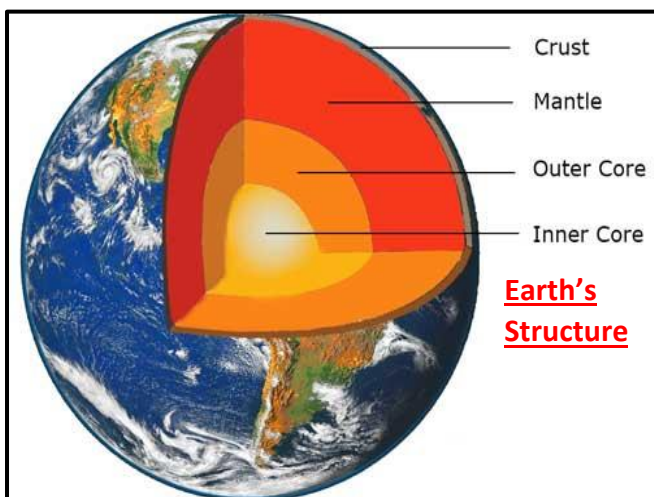


- Muscles have to work in pairs
- This is because they can only pull [contract], not push
- Each of the two muscles pulls in opposite directions
- As the muscles go against each other, they are called **antagonistic muscles**



- Tendons connect muscles to the bones they move at joints

Key Vocabulary	Definition
Minerals	Chemicals that make up rocks. They often lock together to make rocks hard and non-porous, and more useful.
Sedimentary Rock	Rocks that form over millions from the cementation and compaction of layers of rock grains [sediments] that are deposited into the sea. They often contain fossils.
Igneous Rock	Rocks formed from cooled lava or magma [melted rock]. The cooling rate affects the crystal size of the igneous rock's minerals, with slower cooling producing larger crystals. This can be seen using salol.
Metamorphic Rock	Rocks formed from other rock types that have been changed by extreme heat and pressure within the Earth. For example, marble was originally limestone.
Speed	The measurement of how fast something is going. It is calculated by dividing distance by time. Units are metres per second [m/s], miles per hour [mph] or kilometres per hour [km/h]
Relative Speed	The relative speed of two objects travelling compared to each other. The relative speed of two objects going in the same direction is equal to the difference between the two speeds. The relative speed of two objects going in different directions is equal to the two speeds added together.
Friction	The forces that opposes movements between touching surfaces. This can be reduced by using a lubricant [like oil], smoothing a surface or reducing surface contact [with ball bearings]
Drag	The scientific term to describe air and water resistance, the forces that slow down materials as they move through those substances.
Streamlined	A pointed, often flattened shape that reduces drag to increase speed. Similar to aerodynamic. Can be seen on vehicles and fast-moving animals like fish and birds, but also on man-made vehicles
Asthma	An illness where the narrow bronchioles [tubes] in our lungs swell up, making breathing difficult. Often triggered by an allergic reaction.
Drugs	A chemical that affects how the body works. Some are legal, like medicines. Many are addictive.
Alcohol	A drug that depresses the body by slowing nerves and senses, Damages the liver and other organs.
Smoking	A drug that stimulates [speeds up] the body. Causes lung cancer and heart disease. Contains addictive nicotine.

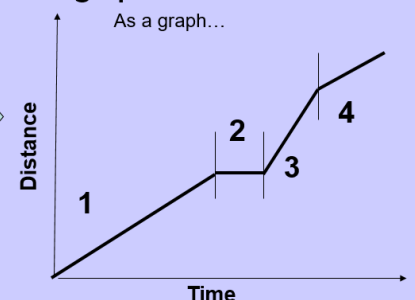


How to use distance / time graphs

•My journey to work

- 1] Drive 3 miles in 30 zone
- 2] Stop at traffic lights
- 3] Drive 2 miles in 60 zone
- 4] Drive 1 mile in 30 zone

video



- KEY:**
- Flat line = Not Moving [2]**
 - Shallow slope = Moving slowly [1 & 4]**
 - Steep slope = Moving quickly [3]**

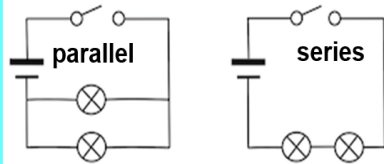
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Unit 4 [Spring / Summer]



How do series circuits differ from parallel circuits?

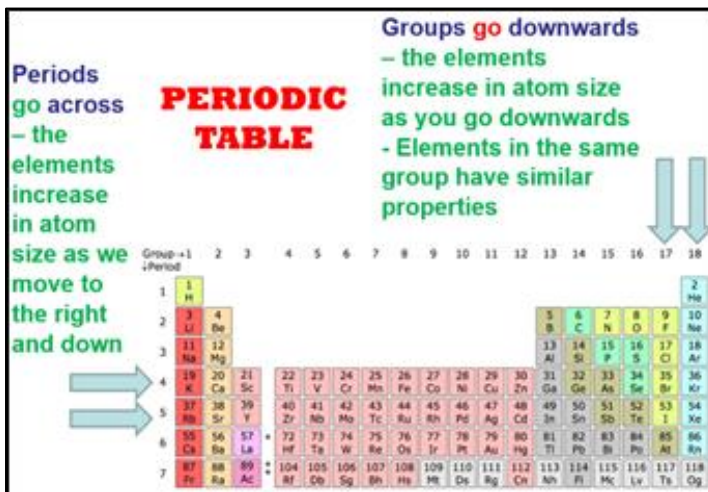
Circuit Types



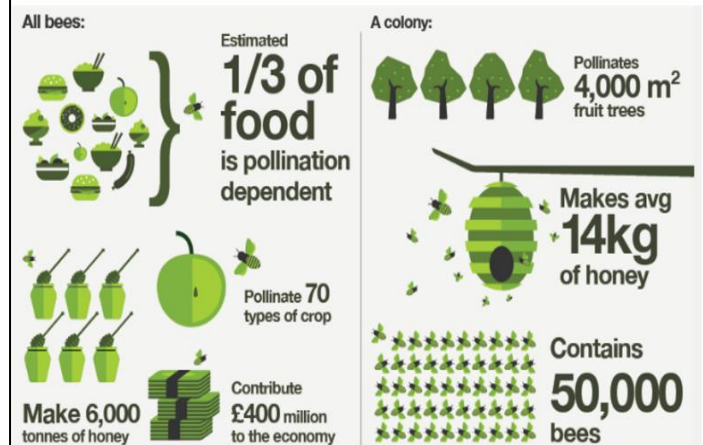
	Does it have extra branches?	Brightness: If we add more bulbs...	If one bulb breaks...
Series	NO	All go DIMMER (In Series)	All go OUT
Parallel	YES	All stay BRIGHT (In Parallel)	The rest stay ON

Circuit Summary

	Current [A]	Voltage [V]
Series Circuit	Same at all points	Shared by outputs
Parallel Circuit	Shared between branches	Same down each branch

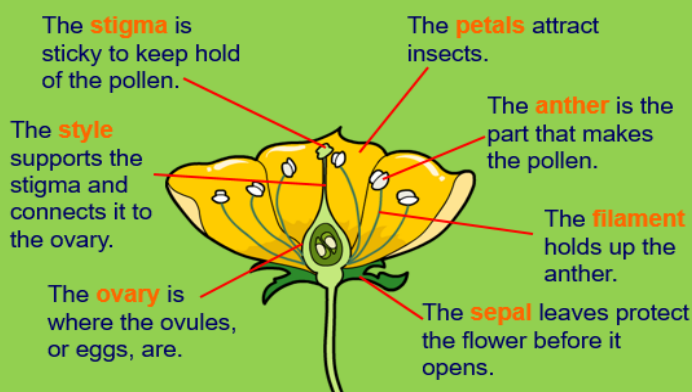


Why are bees so important?



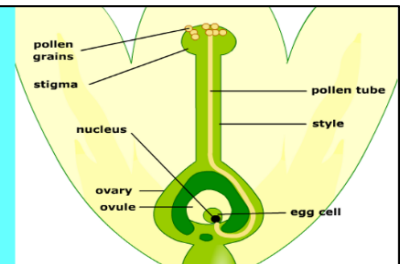
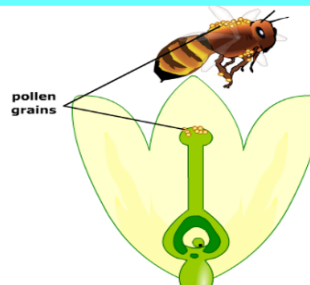
Key Vocabulary	Definition
Resistance	The electrical resistance of an object is a measure of its opposition to the flow of electric current. It can be calculated by dividing voltage by current, measured in Ohms [Ω].
Metal	Most elements are metals. They are shiny, usually hard, good conductors of heat and electricity, malleable [bendable] and ductile [can be stretched]. Non-metals have opposite properties
Reactivity Series	The list of metal in terms of their relative reactivity. Potassium is the most reactive common metal, whereas gold is the least reactive common metal.
Displacement Reaction	A chemical reaction where a more reaction metal takes the place of a less reactive metal in a compound. Train tracks are welded together by reacting Aluminium with Iron Oxide in the Thermite Reaction. Aluminium displaces the iron and takes the Oxide. The left-over iron welds the train tracks together.
Smelting	A process where carbon [coal] is used to remove less reactive metals from rocks [called ores]. This is how iron was first removed from red rock. The carbon reacts with the other chemical in the ore, to leave the metal behind, which can be shaped in useful tools.
Seed Dispersal	The methods that plants use to spread their seeds to increase the chance of the seed finding suitable ground to grow away from the parent plant. These include using wind, water, animals and explosion.

Flower Parts



Pollination

This is the transfer of pollen from one plant to another, by wind or insects



Fertilisation

This is joining of the nucleus of an egg cell and pollen grain to form a seed

The ovary turns into the fruit

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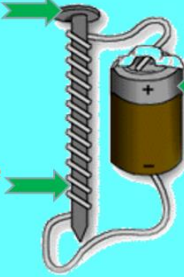
UNIT 5 [Summer]



How do you make an electromagnet?

A core made of magnetic material [not steel]

A coil made of wire



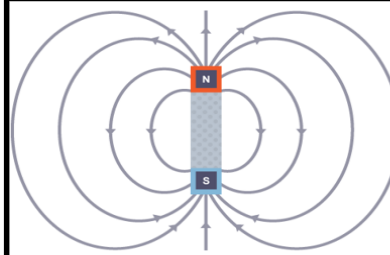
You can make an electromagnet **stronger** by doing these things:

- adding more turns to the coil
- increasing the current flowing through the coil

An electrical current

Electromagnets have some **advantages** over permanent magnets.

- For example:
- they can be turned on and off
 - the strength of the magnetic field can be varied



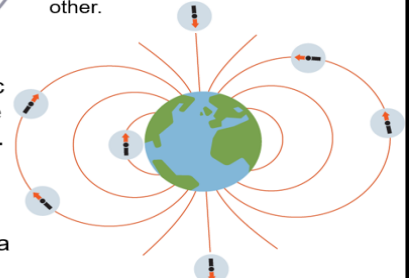
A magnet creates a **magnetic field** around it.

A force is exerted on a magnetic material brought into a magnetic field.

The force is a **non-contact force** because the magnet and the material do not have to touch each other.

The **Earth** produces a magnetic field, in which the field lines are most concentrated at the poles.

This magnetic field can be detected using magnetic materials or magnets, such as a **compass**.



1. Putting Magnets together

- Magnets have a north [red] and south [blue] pole
- Like poles repel, opposite poles attract
- The ring magnets float because they are repelling

2. Stroking a nail with a magnet

- Stroking the iron nail with a magnet lines up the tiny domains [magnetic regions] North to South to turn it into a magnet

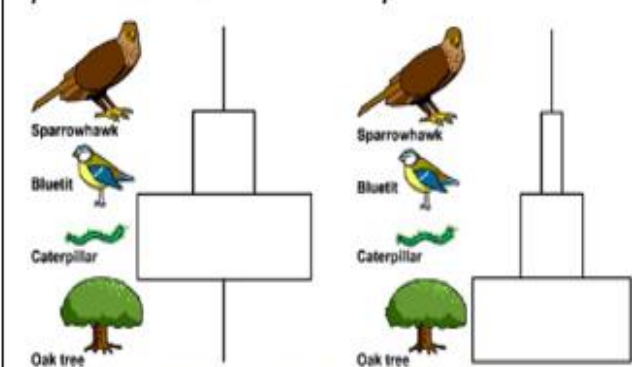
3. Magnetic Materials

- **Attract:** Iron, Steel [Made with Iron], Nickel, Cobalt
- **Copper, Gold, Aluminium and other metals are not affected by the magnet**

4. Magnetism through materials

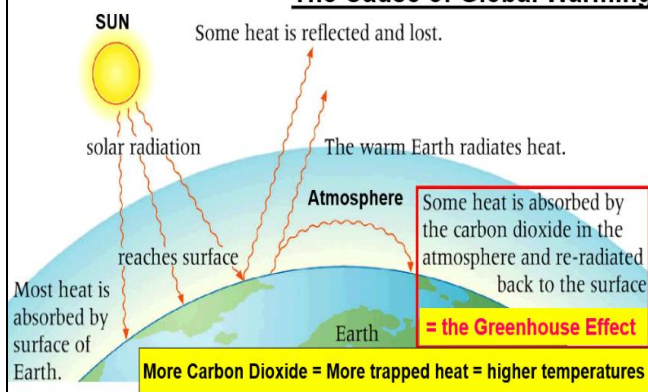
- Magnetism can pass through non-magnetic materials like paper, plastic and wood
- Magnetism won't pass through magnetic materials

In a pyramid of numbers, the length of each bar represents the number of organisms at each level in the food chain.



In a pyramid of biomass, the length of each bar represents the biomass at each level of the food chain.

The Cause of Global Warming



Key Vocabulary	Definition
Food Web	An inter-connected map to show what eats what within a habitat.
Producer	A living thing [such as a plant] that can create its own food. They start all food chains and webs. They are vital for our survival.
Consumer	A living thing [such as all animals] that has to eat another organism to get energy
Predator	A living thing that hunt and eat other organisms called prey . The numbers of predators follows the number of prey in a cyclical pattern.
Pesticide	Chemicals used to kill organisms [pests] that damage crops. They can have harmful effects on useful organisms such as bees, and can damage top predators [as the dosage increases as you move up a food chain].
Biomass	The amount of living material.
Inter-dependence	The principle that living things depend upon each other, and can affect each other. For example, if a layer of a food chain is affected, it will have a knock-on effect elsewhere in the same food chain
Atmosphere	The layer of gases that surround Earth. Consists of Nitrogen [78%], Oxygen [21%], Argon [1%], Carbon Dioxide [>1%] and Water Vapour [>1%]. These levels can be affected by climate or human activity.
Carbon Cycle	The environmental cycle that changes the form that carbon is found in. it is stored in plants, rock and the sea but released by respiration and burning as Carbon Dioxide
Recycling	The collection and reuse of materials such as metal, plastic and paper. Can reduce energy use, environmental impact and preserve limited resources.
Static Electricity	An attraction or repulsion force generated by rubbing insulating materials like plastic. Rubbing transfer electrons to materials, making them negatively charged. They then will attract positively charged items that have lost electrons and repel other negatively charged objects.