KNOWLEDGE ORGANISER Year 7: Cells, Tissues & Organs Page 1 of 2

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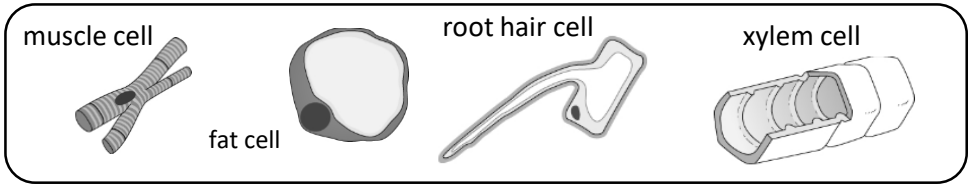
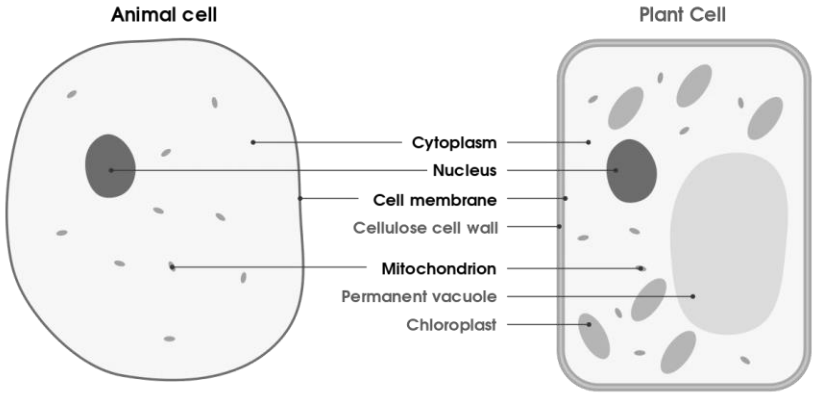
Key Scientific Words

Organism	A living thing.
Cell	The building block of living organisms.
Microscope	An optical instrument used to magnify objects, so small details can be seen.
Cell membrane	Surrounds the cell and controls what substances can move into and out of the cell.
Cytoplasm	A 'jelly like' substance found in cells where all the chemical reactions of the cell take place.
Nucleus	Controls the activities of the cell and contains the genetic material (DNA). Plural is nuclei.
Mitochondrion	Where **respiration** occurs. This releases energy for the cell. Plural is mitochondria.
Chloroplast	Where in the cell photosynthesis takes place, making food for the plant. Contains chlorophyll, which absorbs the energy transferred by sunlight.
Vacuole	Storage space in a plant cell. Contains sap and helps to keep the cell firm.
Cell wall	Provides rigid, strong outer part of cell, made of **cellulose**.
Specialised cell	A cell with a special shape, structure or features which enables it to perform a particular function. e.g. **animals cells** = muscle cells move things and fat cells store fat; **plant cells** = root hair cells take in water, xylem cells carry water



All living organisms carry out seven life processes

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

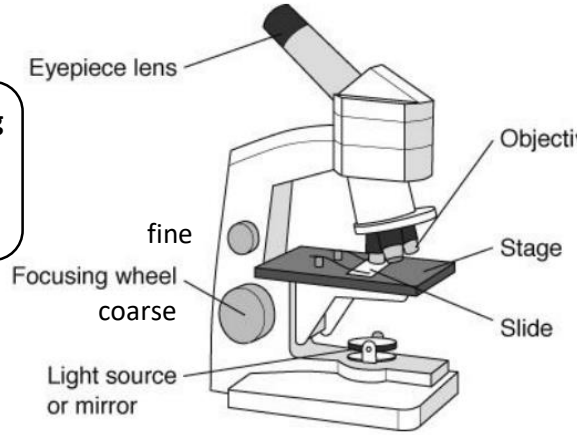


A microscope is used to magnify tiny things such as cells.

total magnification =
magnification of eyepiece lens × magnification of objective lens

The object you look at is the **specimen**. It has to be **thin** to let light get through it. It is placed with a drop of water onto a slide. A coverslip is carefully lowered on top, to **stop** the specimen **drying out**, **hold** it **flat** and **stop** it **moving**. A stain can be used to help you see parts of the cell.

The **focussing** wheels make the **image clearer**



The **greater** the total **magnification** the **larger** the **image**

KNOWLEDGE ORGANISER Year 7: Cells, Tissues & Organs Page 2 of 2

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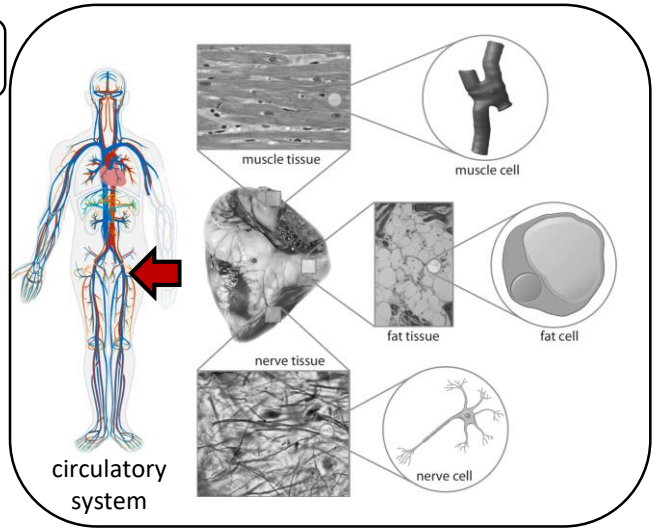
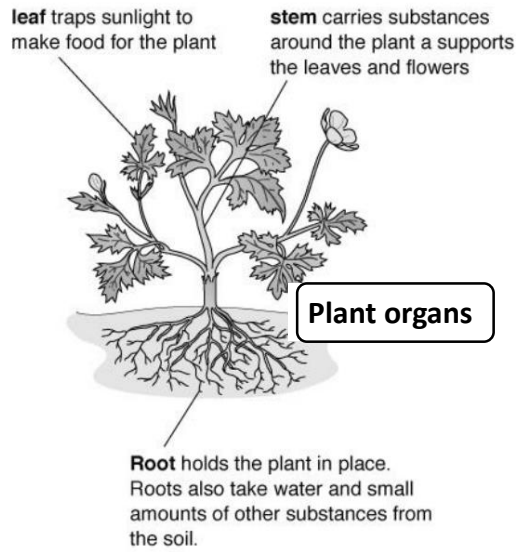
Cells → Tissues → Organs → Organ system → Organism

Tissue is made from a group of cells with a similar structure and function, which all work together to do a particular job.

An **organ** is made from a group of different tissues, which all work together to do a particular job.

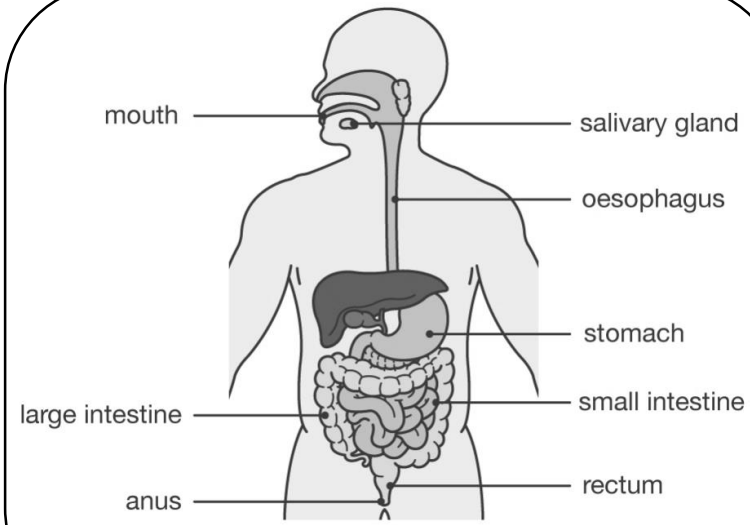
An **organ system** is made from a group of different organs, which all work together to do a particular job.





Plant organs

Breathing system	Trachea (windpipe), lungs	takes air into the body and gets rid of waste gases
Circulator system	Heart, blood vessels (veins, arteries, capillaries)	carries oxygen and food around the body
Digestive system	Mouth, oesophagus (gullet), stomach, small intestine, large intestine, rectum, anus	Breaks down food
Nervous system	Brain, spinal cord, nerves	Carries signals around the body
Urinary System	Bladder, kidney	Gets rid of wate products
Locomotor system	Muscles, bones, tendons, ligaments	Allows movement
Water transport system (plants)	Roots, stem, leaves	Carries water within a plant



Organs of the digestive system

Confidence level?									
Not sure								Very happy	
1	2	3	4	5	6	7	8	9	10

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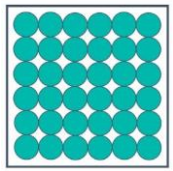
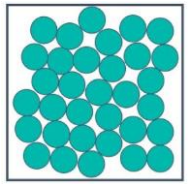
Key Scientific Words

Volume	The amount of room something takes up. Often measured in cm^3
Compress	To squeeze into a smaller volume
Flow	To move and change shape smoothly
Particles	Tiny pieces of matter that everything is made out of
Vibrate	To move backwards and forwards
Brownian motion	An erratic movement of small specs of matter caused by being hit by the moving particles that make up liquids of gases.
Diffusion	When particles spread and mix with each other without anything moving them
Vacuum	A completely empty space containing no particles
Contract	To get smaller
Expand	To get bigger
Density	A measure of a substances mass per unit volume measured in g/cm^3
Random	Having no regular pattern
Diluted	A substance that has had water added to it to make it less concentrated



Solids

- Solids are made up of particles that are very close together. (Strong forces of attraction hold the particles together.)
- The particles in solids vibrate in fixed positions.
- The shape and volume of solids do not change.
- Solids cannot be compressed (squashed) and do not flow.



Liquids

- Liquids are made up of particles that are fairly close together. (Quite strong forces of attraction hold the particles together.)
- The particles in liquids are able to move past each other.
- Liquids have a fixed volumes but their shape can change to fit the container as they flow easily.
- Liquids cannot be easily compressed (squashed).

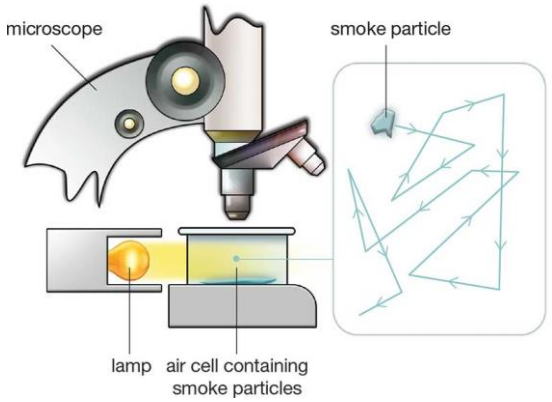
Gases

- Gases are made up of particles that are well spread out. (There are only weak forces of attraction between the particles.)
- The particles in gases move about freely in all directions.
- The shape and the volume of gases can change as they flow very easily and spread out.
- Gases can be compressed (squashed) quite easily.

A **scientific method** describes how scientists try to explain the world around them. These steps could include the following:

- thinking up an idea that would explain the observations. These ideas are called **hypotheses**.
- using the hypothesis to make a **prediction.**
- testing the prediction by experiment, and collecting data.
- checking the **data** to see if it matches the prediction.
- using the data as **evidence** to support the hypothesis (or prove it is wrong).
- forming a **theory** if the hypotheses have been tested many times and shown, by the evidence, to be correct. *The **particle theory** is an example.*

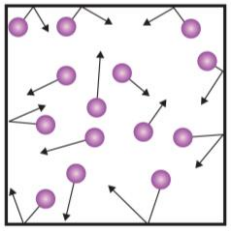
If pollen grains or smoke particles in water are observed through a microscope they are seen to move jerkily in different directions. This is called **Brownian motion.** It is caused by the water particles, which are moving all the time, hitting the pollen grains/smoke specs. The pollen grains are small enough so that when many water particles hit one side of the grain, the grain is moved in that direction.
Brownian motion provides **evidence** to support **particle theory**.

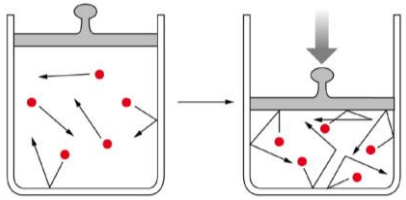


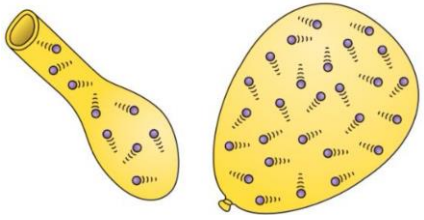
Pressure in gases

Pressure is caused by particles hitting the walls of the container they are in.
The pressure may increase because

- the container has been squashed, making the volume smaller so that the particles will be hitting the walls more often.
- the number of particles has been increased, so that there are more particles moving around to hit the walls.

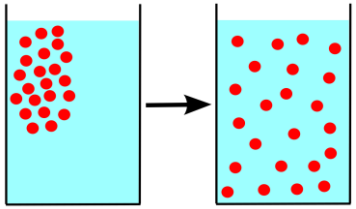




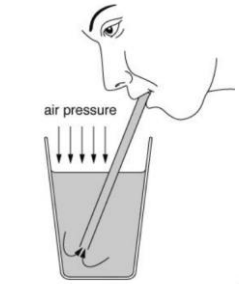


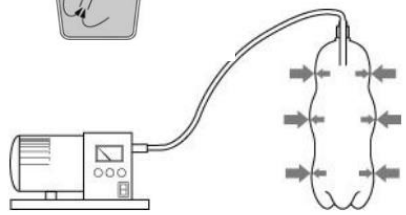
Diffusion is said to have occurred when chemicals mix together without anything moving them. Diffusion occurs because particles in a substance are always moving around. Diffusion is fastest in gases, and slower in liquids.

Diffusion



Air pressure is the pressure caused by air particles around us. Air pressure lets us suck things up using a straw and also causes a container to collapse if the air is sucked out. If all the air is sucked out of a container, you get a **vacuum**





Confidence level?									
Not sure								Very happy	
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KNOWLEDGE ORGANISER Year 7: Energy Page 1 of 2

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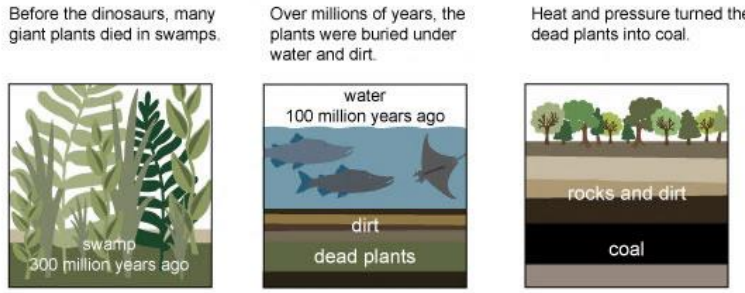
Key Scientific Words

Joule	Unit for measuring energy. Symbol = **J** Kilojoule **kJ** = 1000J
Ratios	Way of comparing different quantities; two numbers separated by a colon : e.g. 2:3
Renewable	Energy source that will never run out e.g. solar power. Opposite to **non-renewable** which will run out because we cannot make more e.g. oil.
Biofuels	Fuel made from lants or animal droppings.
Fossil fuels	Formed from the dead remains of organisms over millions of years ago e.g. coal, oil, natural gas.
Photosynthesis	Process plants need to make their own food. Needs energy transferred by light.
Transferred	When energy is moved from one store to another.

Fossil fuels:

- when burnt produce gases that cause pollution and global warming
- are relatively cheap to obtain
- originally got their energy from the Sun because plants that became coal, oil and natural gas got their energy from the Sun, and the animals that became oil and natural gas got their energy from plants
- Nuclear fuel is also non-renewable. Nuclear power stations produce dangerous waste materials. Electricity is not a fuel. It has to be generated using other energy resources.

How coal was formed



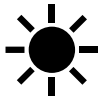
Energy can be <u>transferred</u> by

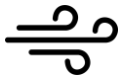
- heating
- light
- sound
- electricity
- forces

Energy can be <u>stored</u> in different ways

Energy stored in…	Commonly called…
the chemicals in food, fuels and batteries	chemical energy
moving objects	kinetic energy
hot objects	thermal energy
objects that are stretched, squashed or twisted	strain energy or elastic potential energy
objects moved to high places	gravitational potential energy
inside the particles that everything is made up from	nuclear energy or atomic energy

Renewable energy resources include

solar 

wind 

tidal 

wave 

biofuels 

geothermal 

hydroelectricity 

Renewable energy resources: pros and cons

+ do not produce harmful gases or contribute to global warming
- are often more expensive than using fossil fuels
+ will not run out but
- are not always available.
+ Hydroelectricity, geothermal energy and biofuels are available at any time.
+ Tidal power is not available all the time, but we can predict when it will be available.
- Energy from solar, wind and waves is only available some of the time.

Most of the energy resources we use store energy that originally came from the **Sun**. Only geothermal power, nuclear power and tidal power do not depend on energy from the Sun.

How energy is transferred to our food:

energy transferred from the Sun by light → energy stored in plants (chemical energy) → energy stored in animals (chemical energy)

vegetables

meat

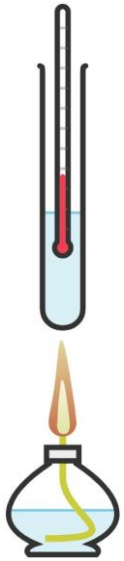
How energy is stored in the wind and in waves:

energy transferred from the Sun by heating → energy stored in hot air (thermal energy) → energy stored in moving air (kinetic energy) → energy stored in moving water (kinetic energy)

wind energy

wave power

Investigating the energy stored on food and fuels



Variables:

Dependent → the result you measure (e.g. increase in temperature)

Independent → the thing <u>you</u> chose to change during the experiment (e.g. different fuels/food)

Control → the things you keep the same during the experiment for a fair test

Reducing our use of fossil fuels

Energy cannot be created or destroyed, but not all energy transferred ends up as useful energy as some of it is wasted

20J every second supplied

18J every second of **light**

2J every second **wasted** by **heating**

4J every second of **light**

16J every second **wasted** by **heating**

Ratio **Useful : wasted**

18 : 2

9 : 1

4 : 16

1 : 4

Confidence level?

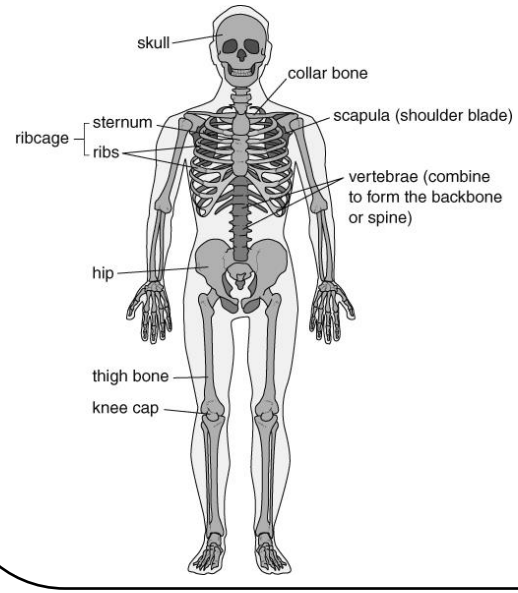
Not sure **Very happy**

1	2	3	4	5	6	7	8	9	10

Key Scientific Words

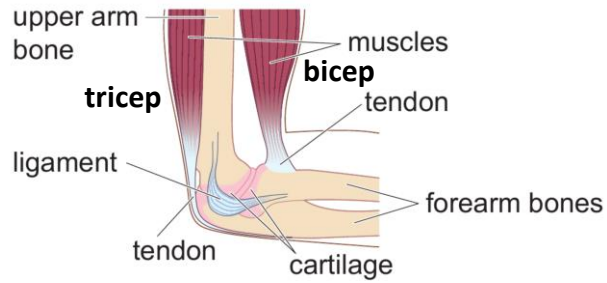
Breathing	The movement of muscles that make the lungs expand and contract.
Gas exchange system	The organ system that allows the exchange of the gases oxygen and carbon dioxide in the lungs. Also known as the breathing system.
Diaphragm	Organ containing a lot of muscle tissue, which contracts and moves downwards to increase the volume of the lungs when inhaling.
Respiration	A process in which energy is released from substances so it can be used by an organism. All living organisms respire.
Ventilation	The movement of air in and out of your lungs.
Artery	A blood vessel that carries blood away from heart.
Vein	A blood vessel that carries blood towards heart.
Haemoglobin	The substance that carries oxygen in red blood cells.
Ligament	A band of tissue that connects bones together.
Cartilage	A slippery substance found on the ends of some bones and used to help form some body parts (e.g. ear, nose).
Tendon	A cord of tissue that connects a muscle to a bone.
Vertebrae	Small bones that form the 'backbone'.
Antagonistic pair	Two muscles that work a joint by pulling a bone in opposite directions e.g. Triceps and Biceps
Depressant	Drug that decrease the speed at which nerves carry impulses from the brain, e.g. alcohol.
Stimulant	Drug that increase the speed at which nerves carry messages from the brain, e.g. caffeine.

Locomotor organ system



Bones are organs that form the **skeleton**, which:

- **protects** some organs
- **supports** your body
- allows you to move (using muscles at your **joints**).
- Bones are hard (to withstand knocks and pressure) and light (so they are easy to move).
- Many have a hollow centre containing **bone marrow**, where **blood cells** are made.

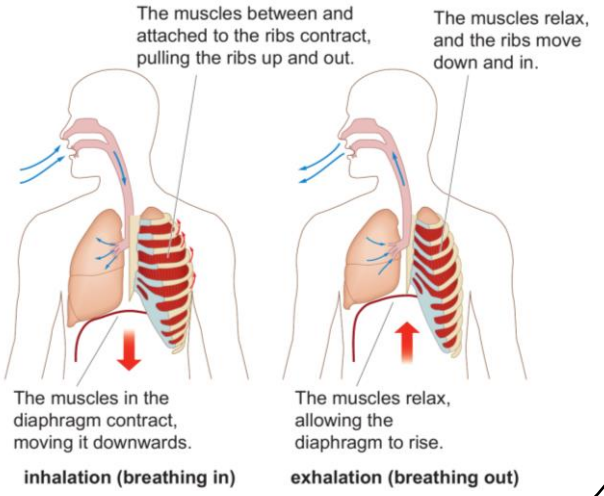


Remember muscles can only pull and never push!

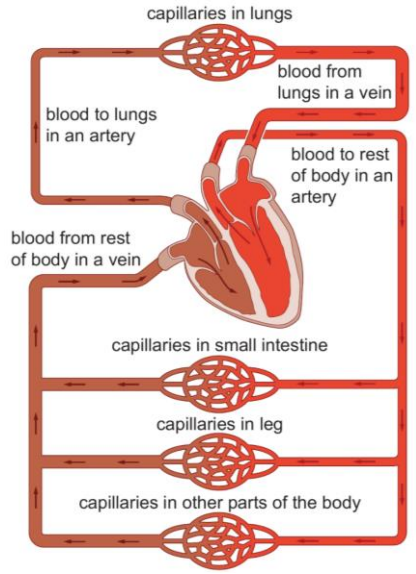
Bones need *pairs* of muscles (**antagonistic pairs**) to pull them in opposite directions. One muscle **contracts** (gets shorter and fatter) to pull a bone. At the same time, the other muscle in the pair **relaxes**.
e.g. to pull your lower arm **up** the **bicep** contracts and gets shorter while the **tricep** stretches.

Muscles are controlled by the **nervous system**. Impulses from the brain travel down the **spinal cord** and along **nerves** to muscles.

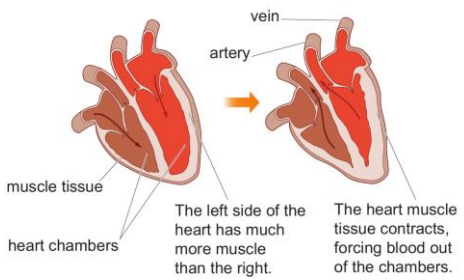
The **gas exchange** or **breathing system** allows air to enter and leave the lungs, so that oxygen can get into the blood and carbon dioxide can leave the blood.

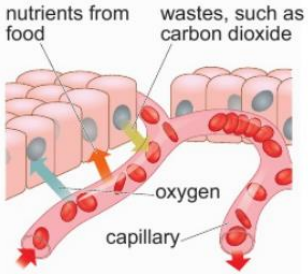


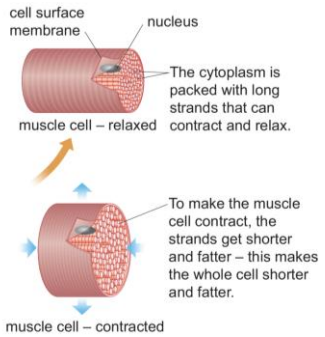
Circulatory system



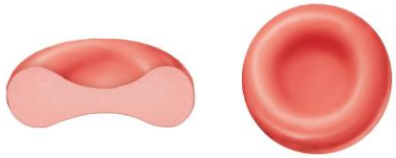
- Blood carried from lungs to heart by veins
- Blood forced back out of heart along arteries to rest of body
- Capillaries have thin walls – allows oxygen and nutrients to leave blood and enter cells
- Carbon dioxide moves easily from cells back to capillaries, to veins to lungs to be exhaled







Muscle cells are *specialized cells,* and adapted to their function – they can change shape and get shorter to produce a pulling force



Blood cells are *specialized cells,* adapted to their function

- No nucleus so more room for haemoglobin
- Flexible so can fit through small capillaries
- Biconcave share to give large surface area so oxygen can diffuse in and out quickly

- **Drugs** are chemicals that affect how the body works.
- **Medicines** are drugs that can help people suffering from diseases
- **Recreational** drugs: people like they effect on their bodies
- Drugs can be **legal** or **illegal** or have age limits
- Some drugs can **damage organs** and have **harmful side effects**
- Some drugs are **addictive**

Confidence level?									
Not sure								Very happy	
1	2	3	4	5	6	7	8	9	10

KNOWLEDGE ORGANISER Year 7 Mixture and separation p1 of 2

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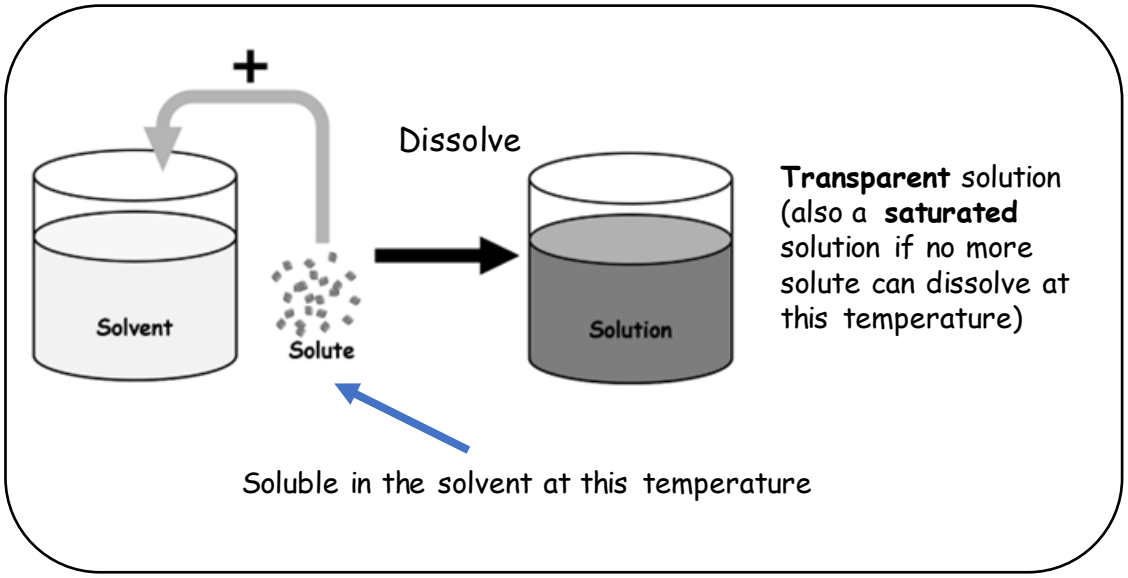
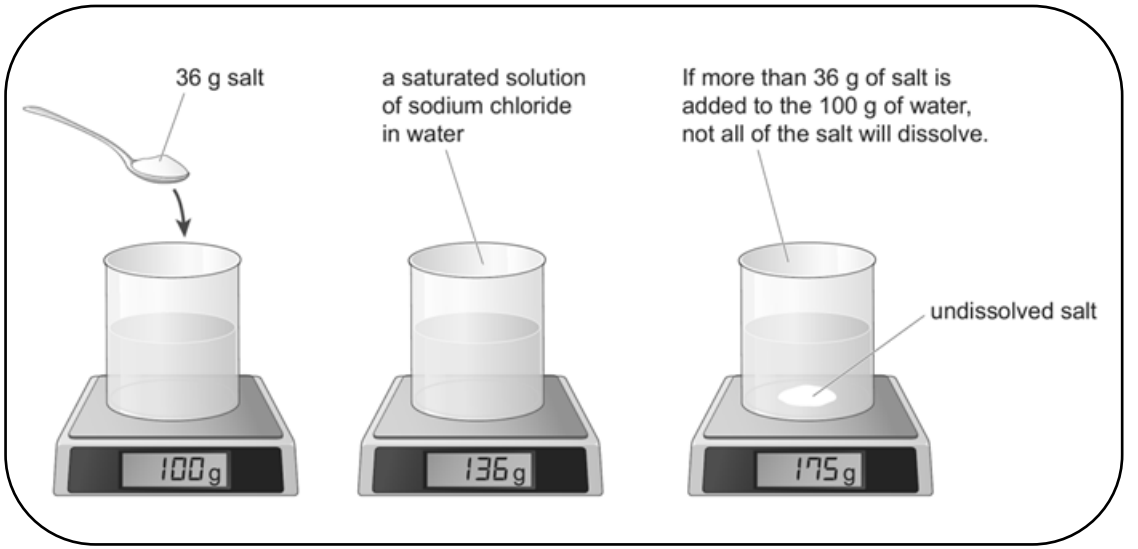
Key Scientific Words

Solvent	The liquid in which a substance dissolves form a **solution**.
Solute	The substance that has dissolved in a liquid to make a **solution**.
Solution	Mixture formed when a **solute** dissolves in a **solvent**. Solutions are **transparent**.
Dissolve	When a substance breaks up and mixes completely with a **solvent** to produce a **solution**.
Soluble	Able to dissolve in **solvent**. For example, sugar is soluble in water because it dissolves to form sugar solution.
Suspension	A mixture where the solid bits are heavy enough to settle out if the mixture is left to stand eg mud in water
Colloid	Mixture of solid, liquid or gas in a solid liquid or gas, where substances do not settle out if left to stand.
Transparent	Clear, can be seen through (can be coloured or colourless).
Opaque	Not possible to see through.
Saturated	A **solution** that contains so much dissolved **solute** that no more **solute** can dissolve in it
Insoluble	Unable to **dissolve** in a particular **solvent**. For example, sand is insoluble in water.
Solubility	The amount of a substance that **dissolves** in a particular **solvent** at a particular temperature to make a **saturated** solution





KNOWLEDGE ORGANISER Year 7: Mixture and separation p2 of 2

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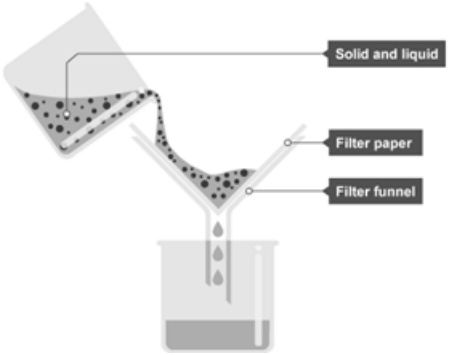
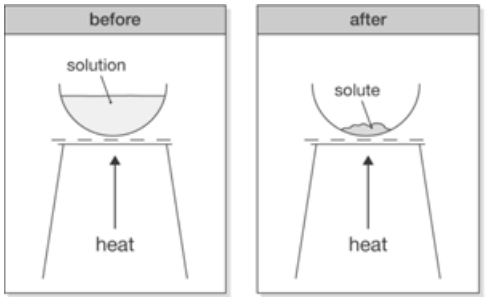
Separation Techniques

Sieving – separates solids of different sizes

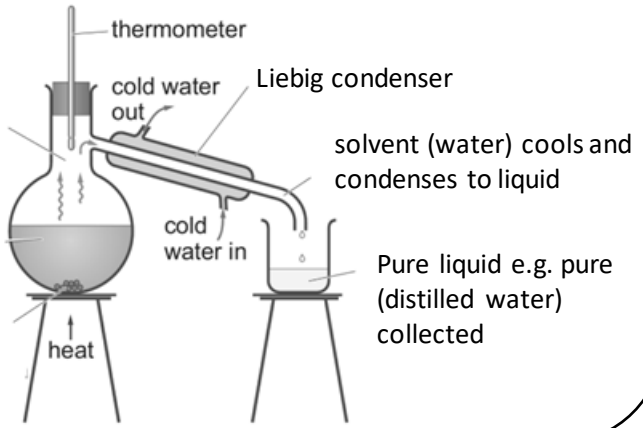
Filtration – separates insoluble solid from liquid



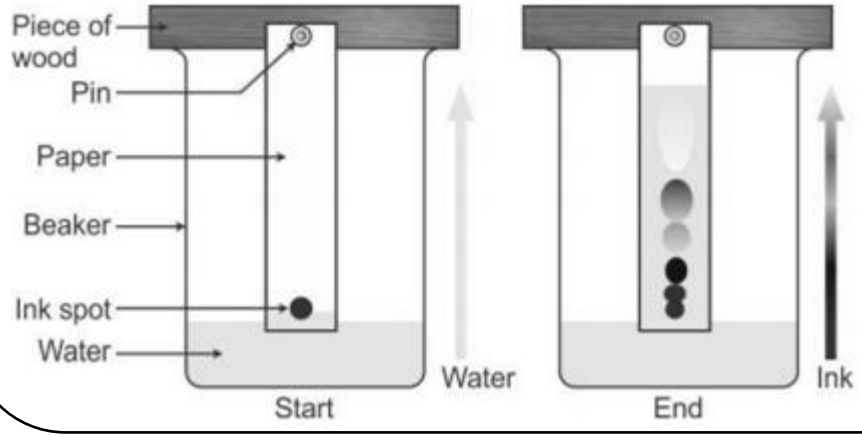
Evaporation – separates soluble solid from a liquid (where you want the solid).



Distillation – separates liquid and soluble solid e.g. water and salt (where you want the liquid) or two liquids e.g. water and ink



Chromatography – separates coloured mixtures



Confidence level?									
Not sure									**Very happy**
1	2	3	4	5	6	7	8	9	10

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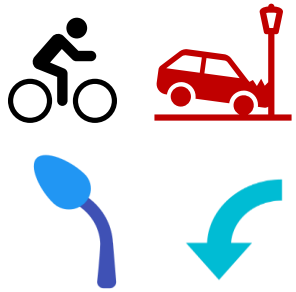
Key Scientific Words

Force	A push, pull or twist on an object.
Contact force	A force where there needs to be contact between objects before the force can have an effect.
Air resistance	A force on objects **moving** through air.
Water resistance	A force on objects **moving** through water.
Upthrust	A force that **pushes** things **up** in liquids and gases.
Friction	A force between two objects that are touching. It usually acts to slow things down or prevent movement.
Non-contact force	A force that can affect something from a distance (e.g. gravity).
Weight	The amount of force with which gravity pulls things. It is measured in newtons (N). Your weight would change if you went into space or to another planet.
Elastic	An elastic material changes shape when there is a force on it but returns to its original shape when the force is removed.
Pressure	The amount of force pushing on a certain area. A way of saying how spread out a force is.
Proportional	A relationship between two variables where one doubles if the other doubles. A graph of the two variables would be a straight line through the origin.
SI Unit	The standard international unit used by Scientists. Units give an understanding of the scale of a measurement.

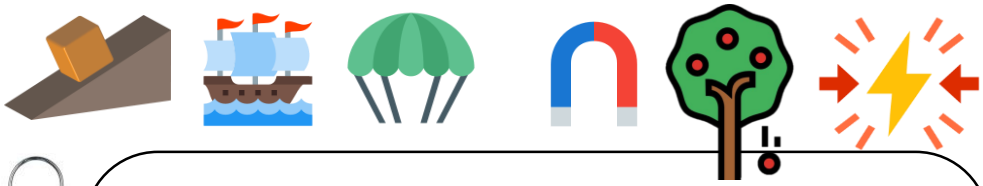
The SI unit for measuring force is the **Newton** (**N**)
It can be measured using a Force Meter

Forces can:

- change the speed things are moving (make them move faster or slower)
- change the shape or size of an object
- change the direction of a moving object.



Contact forces – two objects touching	Non- contact forces – don't touch.
Friction	Magnetism
Air/water resistance	Gravity
Upthrust	Static electricity



Mass is the amount of substance in an object
Mass is measured in **kilograms** (**kg**).
Weight is a force caused by gravity pulling on an object.
Weight is a measured in **Newtons (N)**.

An object on the Moon would have a smaller *weight* than on Earth, because the Moon's gravity is not as strong as Earth's, but would have the same *mass*

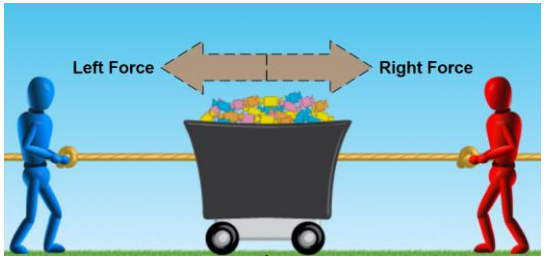
Weight = mass x gravity

Friction can cause things to
- Slow down
- Produce heat
- Make a noise
- Wear things down

Friction can be reduce by
- Lubricating surfaces
- Smoother surfaces

Friction can be increased by
- Using rough surfaces
- Using materials such as rubber

Balanced forces are forces on an object that are the **same size** but work in **opposite directions**.

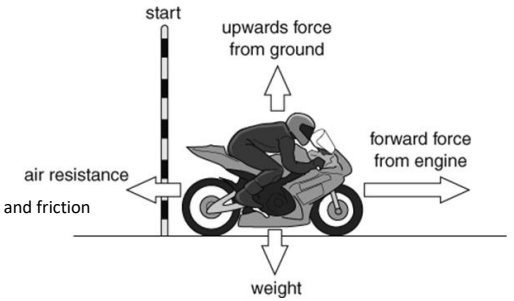


Balanced forces	• A stationary object stays stationary • A moving object stays constant speed
Unbalanced forces	• A stationary object starts to moves • A moving object changes speed (accelerating/slowing down) or direction

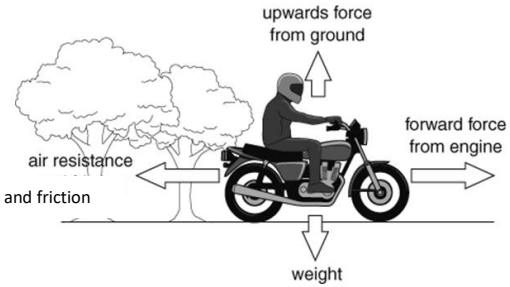
Elastic materials, stretch and **return to their shape** when the force is removed.

The extension of a spring is **proportional** to the force. This is called **Hooke's Law.**

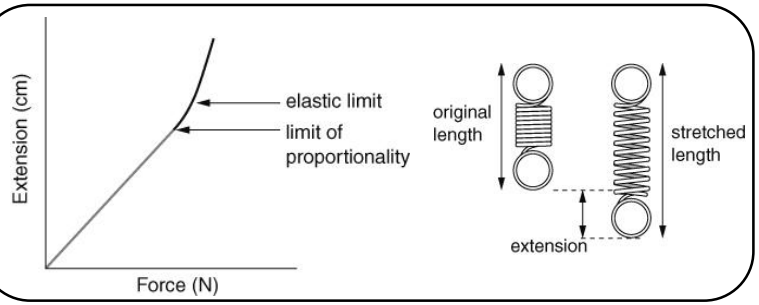
If the spring is stretched too far, it goes beyond it's elastic limit and will not return to it's original shape.



Unbalanced forces – the motorbike will speed up.

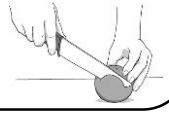


Balanced forces – the motorbike will continue to move at a steady speed.



Snow shoes – a large area giving a small pressure.

Sharp knife – a small area giving a large pressure.



Pressure
- For a certain area, the bigger the force, the bigger the pressure.
- For a certain force, the bigger the area, the smaller the pressure

The SI Unit for Pressure is **Pascals (Pa)**

Pressure = force ÷ area

Confidence level?									
Not sure								**Very happy**	
1	2	3	4	5	6	7	8	9	10

KNOWLEDGE ORGANISER Year 7 Atoms, elements and molecules: p1 of 2

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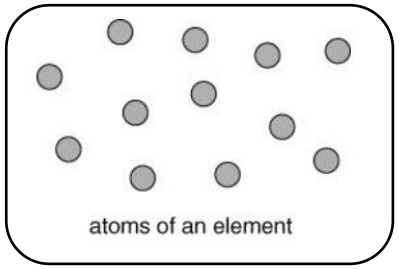
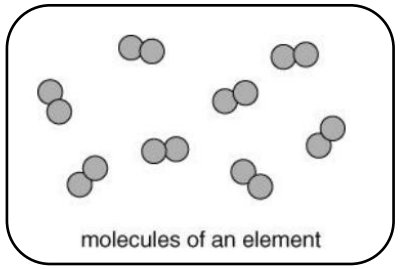
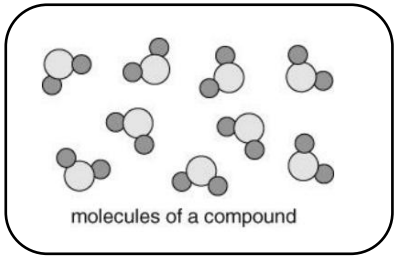
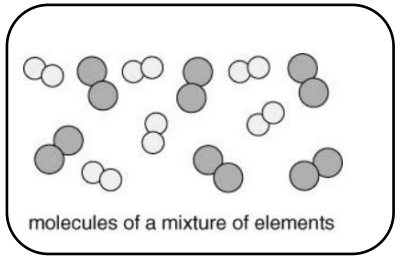
Key Scientific Words

Atom	Small particles from which all substances are made.
Element	A simple substance made of only one type of atom.
Compound	A substance that contains more than one kind of atom (more than one element) bonded (joined) together.
Molecules	Two or more atoms that are joined together in a **group of set size**.
Pure	A single substance that does not have anything else in it.
Mixture	Two or more substances mixed (jumbled) together but not joined to each other. The substances in mixtures can often be separated from each other.



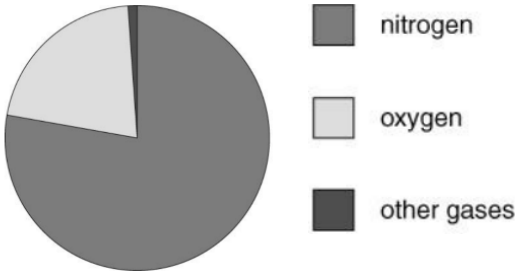


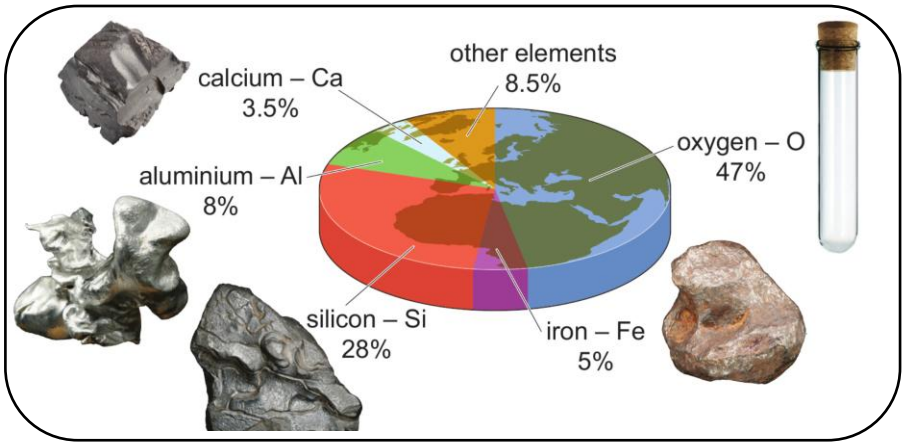




Gases in air	%
nitrogen	78
oxygen	21
other gases	1

Other gases: carbon dioxide; water vapour; argon





There are about 90 different **elements** found on **Earth**. The **periodic table** lists all **118** known **elements** (some elements are manufactured).

Na

sodium

Elements are described by symbols of 1 or 2 letters. **1st letter** is always a **CAPITAL** and the **2nd letter** is always **LOWER CASE**

O

oxygen

We obtain all the elements and compounds we need for living from the Earth's atmosphere and crust. Our **resources** are **limited** and **some may run out** in the near future. We need to take care of our resources, **recycle** more and make **less waste**.

KNOWLEDGE ORGANISER Year 7 Atoms, elements and molecules: p2 of 2

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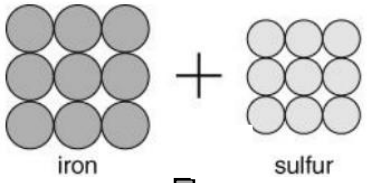
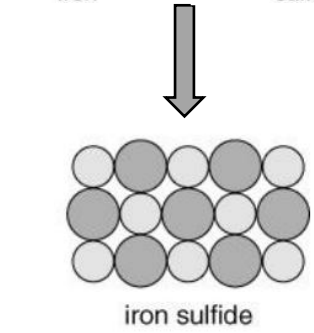
Elements can be classified as metals or non-metals, depending on their properties.

Metals	Non-metals
Typically high melting point solids (*exception* e.g. mercury = liquid at room temperature)	low melting point gases, liquids and solids (*exception* = diamond)
Strong and flexible (malleable = can be beaten/bent into shape, ductile = can be drawn into a wire)	brittle (when solid)
Shiny (when polished)	not shiny
Good conductors of heat	poor conductors of heat (insulators)
Good conductors of electricity	poor conductors of electricity

The **uses** of an element **depend on** its **properties**. The heating element in kettle is **metal** because it is:
Flexible/Malleable: can be bent into different shapes
Conductor of heat: lets heat pass through
Strong: will not break easily
Conductor of electricity: allow electricity to pass through them.

Making compounds
Compounds are formed when elements are mixed and react so that the atoms join together.





Naming compounds
- If there is a metal in the compound, the name of the **metal** goes **first**.
- If the compound contains **only two elements** then one of the element's name has its ending changed to '**ide'.**
- If a compound contains **two elements plus oxygen**, then the name ending of one of the elements is changed to **'ate'.**

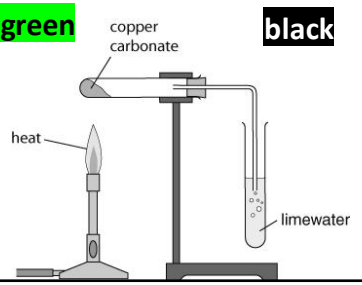
- zinc + oxygen = zinc oxide
- iron + bromine = iron bromide
- sodium + carbon + oxygen = sodium carbonate
- Mono, di and tri prefixes = carbon + 1 oxygen = carbon **mon**oxide; carbon + 2 oxygen = carbon **di**oxide; sulfur + 3 oxygens = sulfur **tri**oxide

Chemical reactions: always form one or more new substances. Occur in everyday life e.g. , burning, cooking, rusting, digesting food. Typical signs of chemical reaction include:
- a colour change,
- a gas being given off,
- a solid forming in a liquid,
- an energy change.

reactants → products

copper carbonate → copper oxide + carbon dioxide

green **black** **gas**



Thermal decomposition reactions = breaking apart with heat

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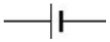
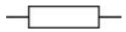
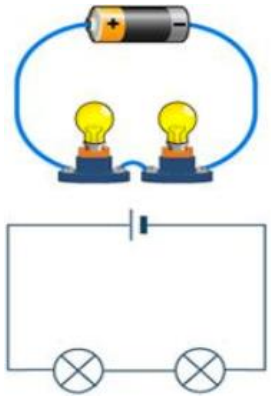
Key Scientific Words

Current	The flow of electricity around a circuit.
Component	Something in a circuit eg a bulb, switch or motor.
Amperes (A)	The Unit for measuring current (measured with an **ammeter**)
Model	A way if showing of representing something that helps you think about it or find out about it.
Charges	Tiny particles that flow around a circuit.
Series Circuit	Circuit in which there is only one loop of wire.
Parallel Circuit	Circuit with branches that split apart and join up again.
Quantitative	Data that is describe in words.
Qualitative	Data that is described in numbers.
Variable	Anything that can be changed and be measured.
Independent variable	The variable that you choose the values of in an investigation.
Dependent variable	The variable that is measured in an investigation.
Voltage	Provides the "push" i.e. how much energy is being transferred by a current. Measured in **Volts** (**V**) using a **Voltmeter**.
Fuse	A piece of wire that melts if too much electricity is passed through it.
Circuit breaker	A safety device that switches off the electricity supply if the current is too big.
Resistor	A component that makes it difficult for electricity to flow (used to reduce the size of the current in a circuit).

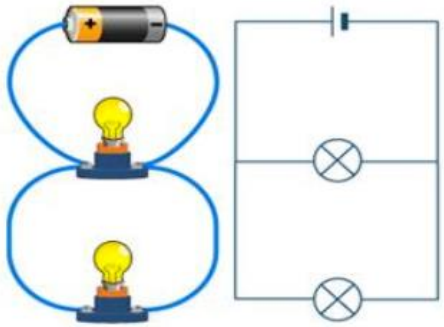
Component	Symbol	Component	Symbol	Component	Symbol
cell		bulb		ammeter	
switch		resistor		voltmeter	

Components in Series



- If one bulb breaks, all the others go off.
- The current is the same everywhere.
- If you put more bulbs in they will be dimmer, because it is harder for the electricity to get through.
- The resistance of the circuit is higher with more bulbs.

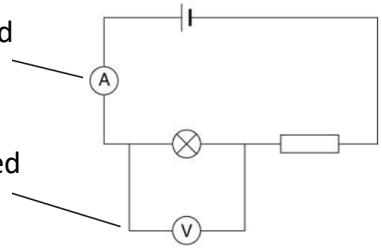
Components in Parallel



- If one bulb breaks, the bulbs in the other branches stay on.
- The current splits up when it comes to a branch.
- The current in all the branches adds up to the current in the main part of a circuit.
- If you add more bulbs, they stay bright because it is easier for the current to flow with more branches, because there are more ways for the charges to go.

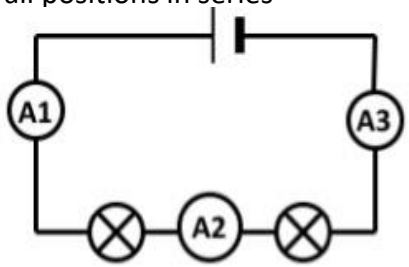
Ammeters are connected in series in a circuit

Voltmeters are connected in parallel in a circuit



Current in a Series circuit

- When we connect components in series, it means that a unit of charge has to flow first through one component and then through the other.
- This means that current is the same in all positions in series



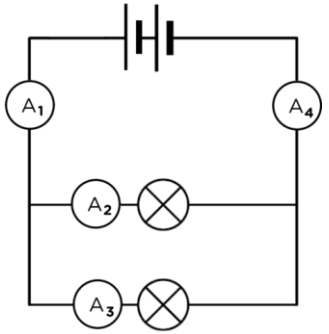
A1 = A2= A3 e.g. if A1 = 2A, then A2 = 2A and A3 = 2A

Reducing risk

- Never touch bare parts of metal plugs
- Never poke things into sockets
- Keep electricity away from water
- Do not plug too many things into one socket
- Never use something with a damaged wire

Current in Parallel circuit

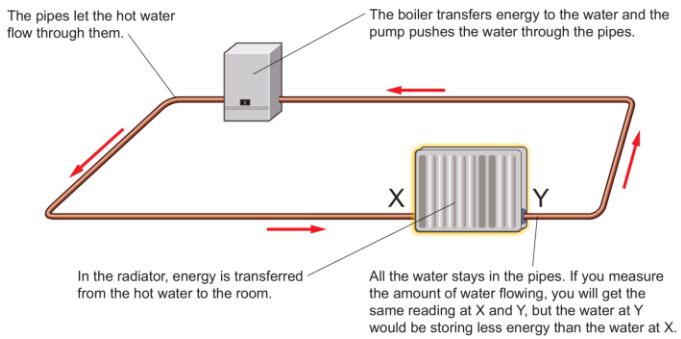
- When two components are connected in parallel, the current is shared between the components.
- The current is not always shared evenly, it depends upon the resistance of the components in the loop.
- The current is shared when it reaches the branches, then adds again where the branches meet.



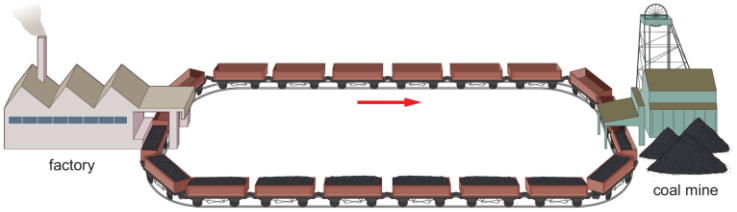
A1 = A4 and A2 + A3 = A1
e.g. if A1 = 12A then A4 = 12A

if A2 = 3A then A3 = 12-3 = 9A and since A1 = A4 = 12A

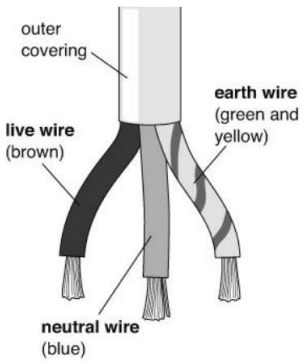
Using Models to think about electricity

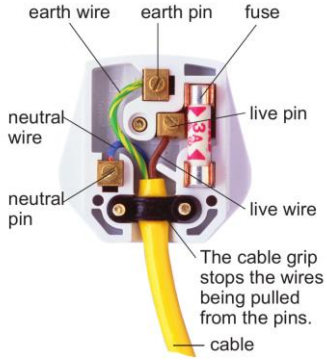


Boiler = cell; radiator = component eg bulb; water = charges; temperature of water = energy transferred by the charges



Factory = cell; coal mine = component eg bulb; train = charges; coal = energy transferred by the charges





Confidence level?									
Not sure								Very happy	
1	2	3	4	5	6	7	8	9	10

KNOWLEDGE ORGANISER Year 7: Sexual Reproduction Page 1 of 2

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Key Scientific Words

Scientific method	Any way of testing that involves collecting information in order to show whether something is right or wrong.
Observation	Something that you see happening.
Hypothesis	An idea about how something works that can be tested with experiments.
Prediction	What you think will happen in an experiment.
Ovulation	When an egg cell is released from an ovary.
Fertilization	**Fusing** of a male **gamete** with a female **gamete**.
Fuse	When two things join together.
Gametes	Cells used for sexual reproduction. **Sperm cell** = males sex cell; **egg cell** or **ovum** = female sex cell.
Zygote	Fertilized egg cell produce when two **gametes fuse.**
Puberty	A time when big physical changes happen in the body.
Embryo	A fertilised egg (**zygote**) divides to form a ball of cells called an **embryo**; once a full set of organ are developed the embryo is called **foetus.**
Menstruation	When the lining of the uterus and a little blood pass out of the body through the vagina.
Menopause	When the ovaries in a woman stop releasing egg cells.
Hormones	Chemical messengers released by glands that move into the blood and are carried to a specific organ.
Antibodies	A substance produced by white bold cells that help fight microorganisms that might cause diseases.

The scientific method

In 1688 Redi **tested** his **hypothesis** that maggots were caused by flies laying eggs in meat.

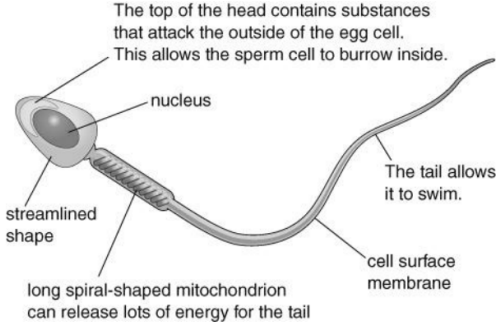
Fertilisation

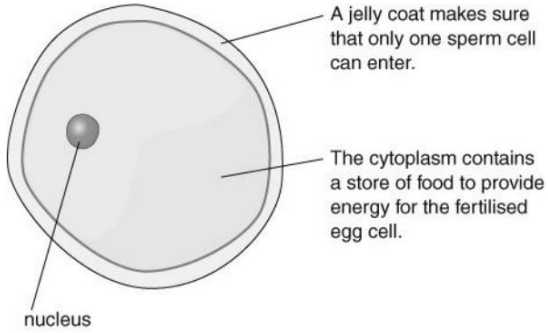
- Requires two specialise sex cells called **gametes**
- The sperm cell enters the egg cell and the **two nuclei fuse** together and become one
- A **fertilised egg** cell (a **zygote**) is then formed
- This will grow into a new organism

Fertilisation can happen:

- **Internally** when the male parent places the sperm cells inside the female e.g. mammals
- **Externally** when this happens outside the bodies of the animals e.g. fish
- The **offspring** can then **develop inside** the mother e.g. humans or outside the mother e.g. eggs of birds and reptiles

Sperm and egg cells are adapted to their functions.
A sperm cell is much smaller than an egg cell.





KNOWLEDGE ORGANISER Year 7: Sexual Reproduction Page 2 of 2

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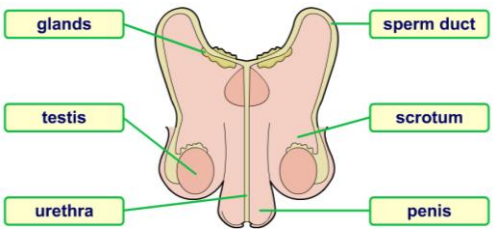
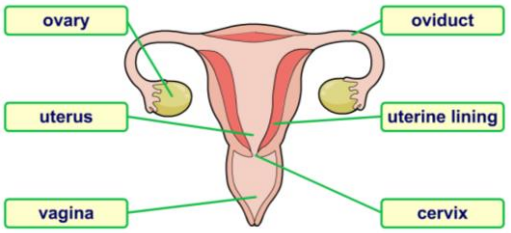
Male reproductive system



Female reproductive system



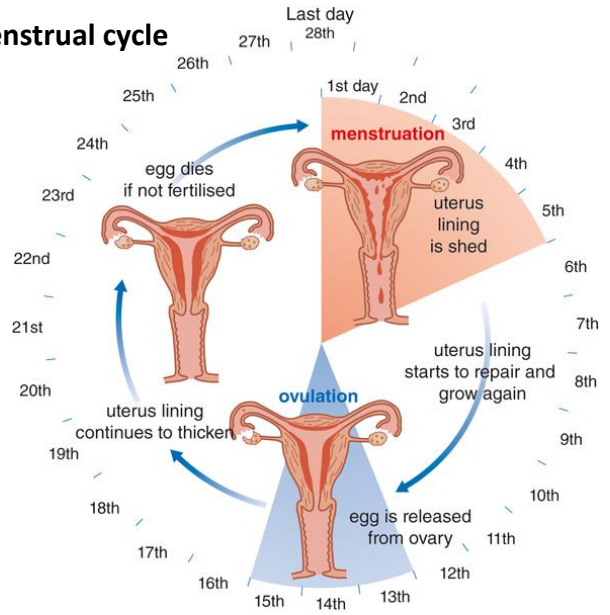
Puberty

Changes in boys	Changes in girls
• hair grows under arms, on face and on chest	• hair grows under arms
• pubic hair grows	• pubic hair grows
• shoulders get wider	• hips get wider
• body smell increases	• body smell increases
• testes start to make sperm cells	• ovaries start to release egg cells
• testes and penis get bigger	• breasts develop
• voice deepens ('breaks')	

Parts	Function
Testes	Produce sperm
Sperm ducts and glands	The sperm pass through the sperm ducts and mix with fluids produced by the glands; this is now called semen
Penis	Passes urine and semen
Urethra	The tube inside the penis that carries urine or semen

Parts	Function
Ovaries	Produce sperm
Oviduct	Tube that carries egg cells from ovaries to uterus. Fertilisation happens here
Uterus	Where the embryo develops
Cervix	Ring of muscle at the bottom of uterus
Vagina	Leads from cervix to outside body

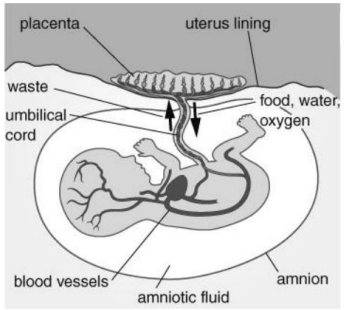
Menstrual cycle



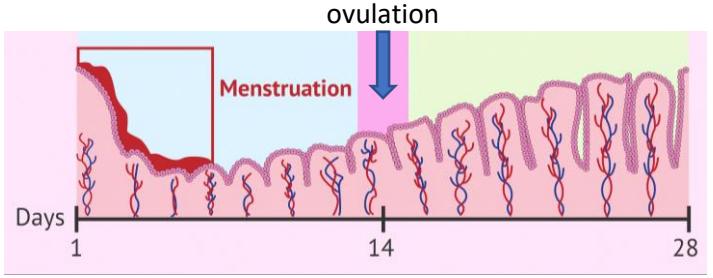
Pregnancy in mammals

- After fertilisation, egg cell divides to form a ball of cells (an embryo). The **embryo** travels to the **uterus** where it sinks into the uterus lining (**implantation**). The woman is now pregnant.
- Once the embryo has developed all its organs it is called a **foetus**.
- It takes about 40 weeks (9 months) for a human fertilised egg cell to grow into a baby ready to be born. This time is called the **gestation** period.

Mother's breasts contain mammary glands that produce milk to feed the baby. Breast milk contains all the **nutrients** that a baby needs as well as **antibodies.**



Changes to uterus lining



Confidence level?									
Not sure									Very happy
1	2	3	4	5	6	7	8	9	10

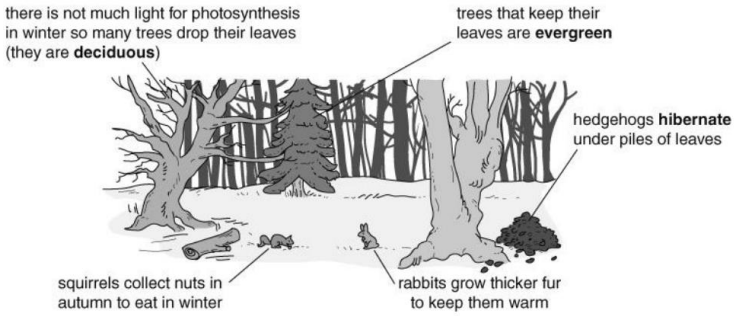
KNOWLEDGE ORGANISER Year 7: Ecosystems Page 1 of 2

THE DEAN TRUST Ashton on Mersey School

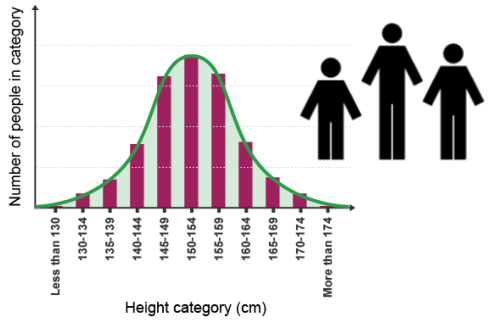
Key Scientific Words

Variation	The differences between things.
Continuous	Data values that can have any value (between two limits) e.g. human height.
Discontinuous	Data values that can only have one set of number options e.g. shoes sizes or days of the week.
Biodiversity	Biodiversity is the planet's full range of life forms. Humans are only one species among millions and biodiversity benefits humans and other species alike.
Inherited variation	Differences between organisms passed on to offspring by their parents in reproduction.
Gametes	A cell sell used for reproduction.
Nocturnal	Organisms that are only active at night are **nocturnal**.
Deciduous	Plants that lose their leaves in winter.
Evergreen	Plants that do not lose their leaves in winter
Predator	An animal that catches and eats other animals.
Prey	An animal that is caught and eaten by another animal.
Persistent	A chemical substance that does not get broken down in nature very quicky is **persistent**.
Interdependent	Organisms that depend on one another are said to be **interdependent.**

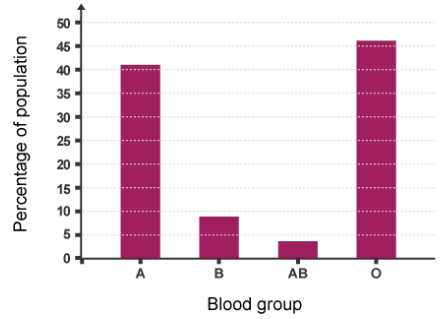
Ecosystem		
	Environment	The conditions surrounding an organism; abiotic (non-living) and biotic (living).
	Habitat	Place where organisms live e.g. woodland, lake.
	Population	Individuals of a species living in a habitat.
	Community	Populations of different species living in a habitat.



- An environment is affected by non-living factors (e.g. **light**, **dampness**, **temperature**), called **physical environmental** factors.
- Physical environmental factors change from day to day (daily changes).
- As the conditions change, the organisms respond e.g. nocturnal animals are only active at night.
- Physical environmental factors change over the year (seasonal changes).
- Organisms respond to these changes e.g. in autumn some birds migrate to warmer countries to feed during the winter.



Continuous variation	Discontinuous variation
Height	Blood group
Weight	Hand used to write with
Arm span	Eye colour
Head circumference at birth	Ability to roll tongue



Adaptations: Polar Bear

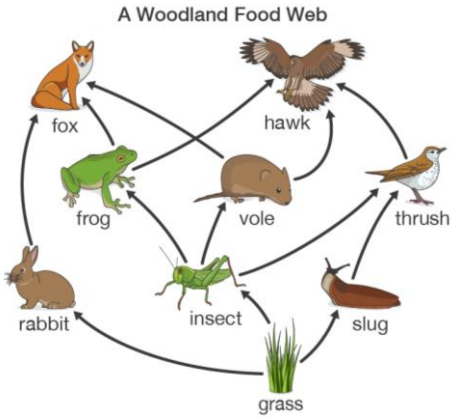
- Small ears – to reduce heat loss.
- White fur – increased **camouflage** so that they can hunt better.
- Thick fur – to help keep the animals warm.
- Rough soles – to grip on the ice.
- Small **surface area : volume ratio** to reduce heat loss.
- Large feet – to spread weight and stop it from sinking into the snow; also improves swimming.
- Good sense of smell to detect prey.
- Sharp teeth and claws to ensure capture of prey/ripping flesh.

A food chain is used to show the transfer of energy from organism to organism

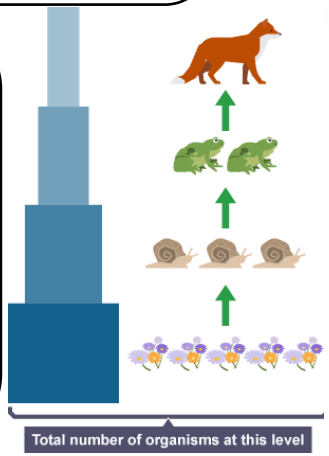
Grass → Insect → Vole → Hawk

(producer) → (primary consumer) → (secondary consumer) → (tertiary consumer/top predator)

The **arrows** shows the direction of **transfer of energy**. Grass absorbs sunlight for photosynthesis, which is the starting energy for a food chain.

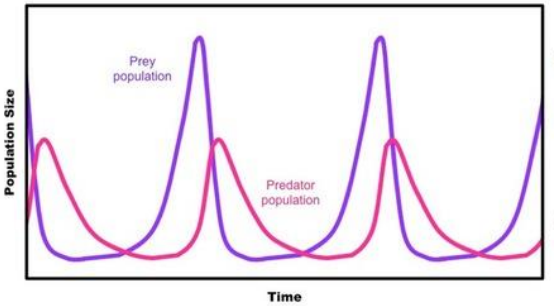


Pyramid of **numbers** show the **number** of **organisms** at each **stage**.
Energy is **lost** at each stage of the food chain: the energy stored in food is **released** by **respiration** (to let animals move and keep warm) and undigested is food passed as **waste,** so there is **less** energy available for the next level

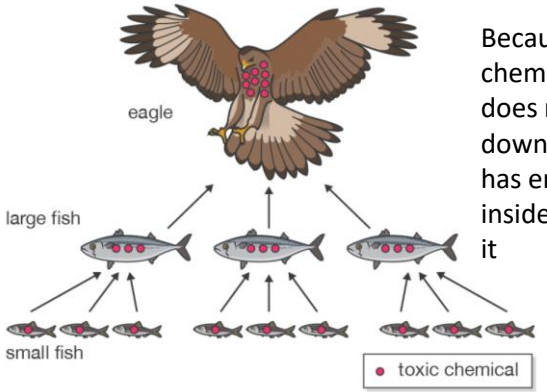


Populations. The size of a population is affected by several factors:

- Organisms compete with each other for resources.
- Competition for resources may cause populations of some organisms to decrease.
- Disease can kill organisms.
- Poisons may kill organisms, or kill the organisms that they depend on.
- Some pesticides are persistent and can build up in the animals as you go along a food chain, harming the top predators.
- Changes in one population can affect other populations.
- When there are a lot of prey organisms, the number of predators increases because they have plenty of food.
- This decreases number of prey, which leads to a decrease in the number of predators.



When there are lots of hares the lynxes have lots to eat so they reproduce successfully and their population goes up



Because the toxic chemical e.g. DDT does not break down, the eagle has enough poison inside to harm/kill it

Confidence level?

Not sure								Very happy	
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