Mixtures and Separation

Mixtures

What is a mixture?

Two or more substances jumbled together but not joined to each other.

Match the keyword with the correct definition.

Suspension	Two or more substances jumbled together.
Colloid	You cannot see through it.
Solution	A mixture of a solid, liquid or gas in a solid, liquid or gas, where the substances do not settle out if left to stand.
Mixture	A mixture of a solid and liquid, where the solid bits are heavy enough to settle out if the mixture is left to stand.
Opaque	You can see through it.
Transparent	When a substance has dissolved in a liquid.

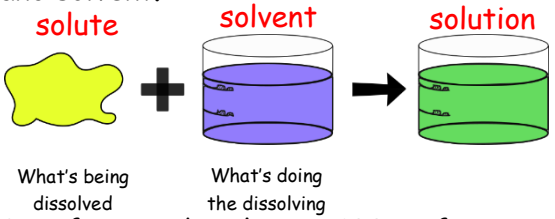
Solutions

Define the following words:

Dissolve – When a substance breaks up into such tiny pieces in a liquid, it can no longer be seen and forms a solution.

Soluble – Describes a substance that can dissolve in a liquid.

Label the diagram with solution, solute and solvent.



2 g of sugar dissolves in 100 g of water. What is the mass of the solution?

102 g – conservation of mass.

More salt is added to a saturated salty water solution. What will happen to the added salt and why? The added salt will not dissolve as the solution is already saturated. No more salt will dissolve.

Evaporation

What is evaporation? When a liquid becomes a gas at the surface of the liquid.

What is boiling? When a liquid becomes a gas, forming bubbles inside the liquid volume.

State two similarities of evaporation and boiling.

- The liquid changes state to a gas.
- If there is a solute dissolved in the water it will be left behind when the water evaporates or boils.

State two differences of evaporation and boiling.

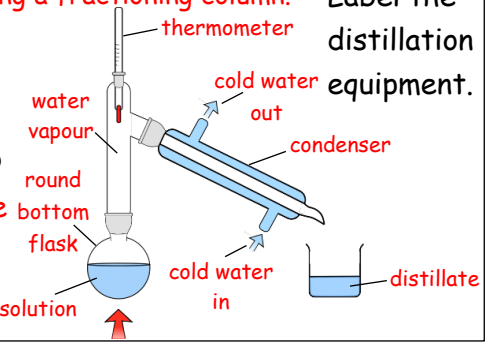
- Evaporation takes place slowly at low temperatures. The rate of evaporation increases as the temperature increases.
- A pure liquid only boils at one temperature, its boiling point.

Distillation

What is the difference between simple distillation and fractional distillation?

Simple distillation separates one substance from a solution, fractional distillation separates multiple 'fractions' using a fractioning column.

Label the distillation equipment.



What is desalination?

Removing the salts from sea water.

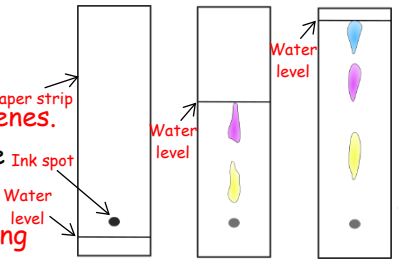
Chromatography

State two uses of chromatography:

1. To identify contents of food.
2. Forensic analysis of crime scenes.

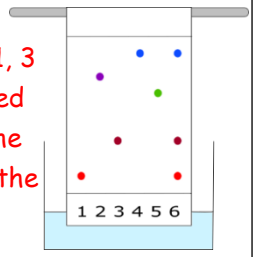
Why must the ink spot be placed above the solvent line? Otherwise the ink would dissolve into the water, preventing a proper separation of the colours.

Label the diagram below.



Sample 6 contains which other samples? Explain your answer.

Sample 6 contains inks 1, 3 and 4 as 6 has separated to these colours and the spots have travelled up the same distance of the paper.



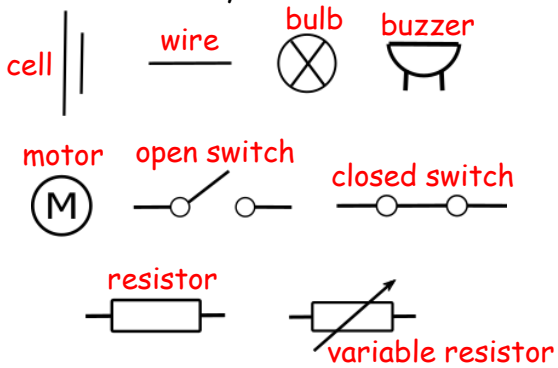
Current Electricity

Current and Switches

What is a current?

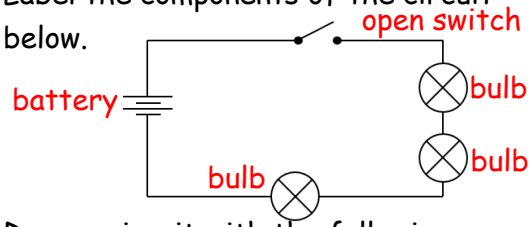
The amount of electricity that is flowing around a circuit.

Label the circuit symbols below.

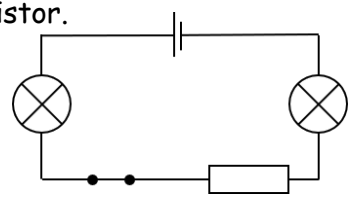


Models for Circuits

Label the components of the circuit below.

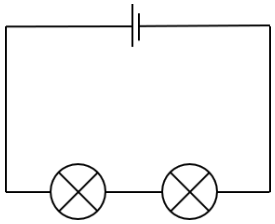
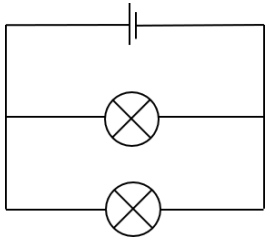


Draw a circuit with the following components: cell, wires, two bulbs, a switch and a resistor.



Series and Parallel Circuits

Sketch a series and parallel circuit below.

Series – A circuit in which there is only one loop of wire.	**Parallel** – A circuit with two or more branches that split apart and join up again.
	

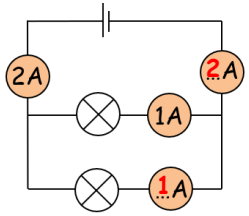
In a series circuit with two bulbs, what will happen if one bulb 'blows'?

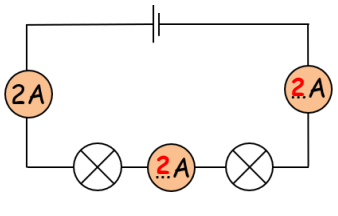
The circuit will stop working and the second bulb will go out.

In a parallel circuit with two bulbs, what will happen if one bulb 'blows'?

The second bulb will not go out.

Label the ammeter readings (the current) on each of the circuits.





Changing the Current

What two things does the current in a circuit depend upon?

1. The voltage of the cells or power pack.
2. The components in the circuit.

What is voltage and what is it measured in?

Voltage is how much energy that is being transferred by electricity, the potential difference. Voltage is measured in volts (V).

What happens to current when the voltage in a circuit is increased?

The current increases.

What is used to measure current and voltage?

Used to measure current - Ammeter

Used to measure voltage - Voltmeter

What is resistance?

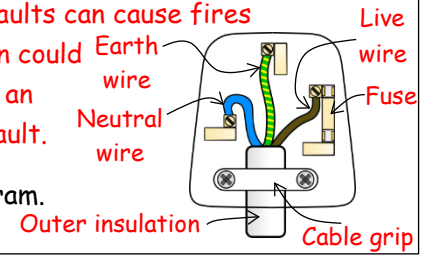
How difficult it is for electricity to flow through a device or material.

Using Electricity

List three dangers of electricity.

1. Touching live parts cause shock and burns.
2. Electrical faults can cause fires
3. An explosion could result from an electrical fault.

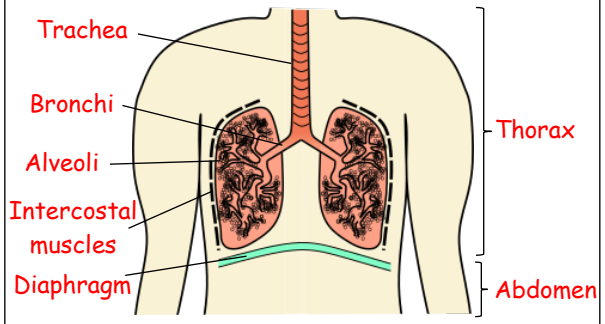
Label the plug diagram.



Muscles and Bones

Muscles and Breathing

Label parts of the respiratory system.



What is the keyword for breathing in?

Inhalation

How does the body draw air into the lungs?

Muscles in the diaphragm contract, pulling down. Muscles between the ribs contract, pulling the rib cage up and out. This causes the lungs to expand, drawing air into the lungs through the mouth and nose.

What is the keyword for breathing out?

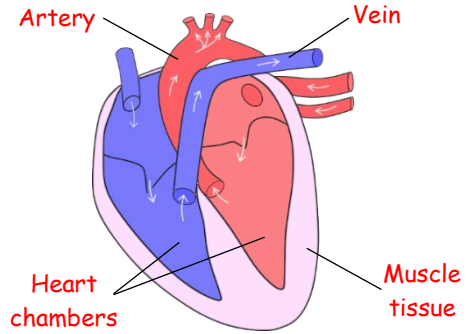
Exhalation

How does the body draw air out of the lungs?

The chest muscles relax causing the rib cage to fall and sink in. Muscles in the diaphragm relax, causing it to arch up. This squeezes the lungs, reducing the volume of the lungs and forces air out.

Muscles and Blood

Label parts of the heart below, which shows the flow of blood through the heart.



State the contents of blood and give their relavent function.

Part	Function
Red blood cells	To carry oxygen from the lungs to the cells.
White blood cells	To keep us healthy by protecting the body against infection and foreign bodies.
Plasma	Contains many dissolved substances such as nutrients absorbed from food.

How many chambers does the heart have?

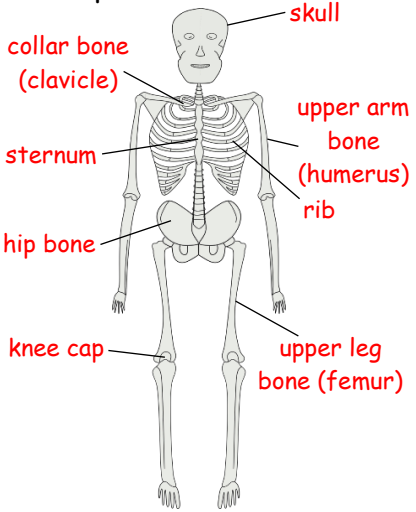
Four – right atrium, left atrium, right ventricle, left ventricle.

State the three different forms of blood vessels and their functions.

Part	Function
Arteries	Carry blood away from the heart and to the organs in the body.
Veins	Carry blood back to the heart from the organs.
Capillaries	Carry blood to and from individual cells.

Muscles and Moving

Label parts of the skeleton.



Define the following terms.

Ligament: A band of tissue that connects bones together.

Tendon: A cord of tissue that connects a muscle to a bone.

Cartilage: A slippery substance that is found on the ends of some bones.

What does our skeleton do?

1. Support
2. Protection
3. Movement

Name four different types of joints in the body.

1. Ball and socket joint
2. Saddle joint
3. Hinge joint
4. Swivel joint

Drugs

What is a drug?

A substance that affects the way your body works.

Define the following terms and give an example drug of each.

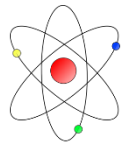
Recreational drugs: Drugs taken for pleasure, e.g. alcohol.

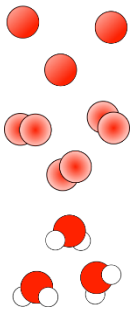
Stimulants: Drugs that cause the nervous system to carry impulses faster, e.g. caffeine.

Depressants: Drugs that slow down the nervous system, e.g. heroin.

Atoms, Elements and Molecules

Atoms, Elements, Compounds and Molecules





Define the following keywords:

Atom – A small particle from which substances are made.
Element – A simple substance made of one type of atom.
Molecule – Two or more atoms chemically joined together.
Compound – Two or more elements chemically joined together.

Earth's Elements

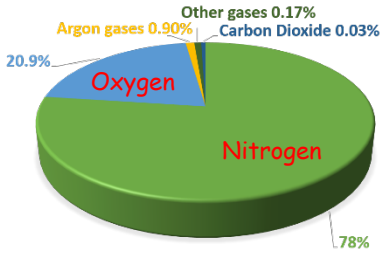
All elements are shown on the Periodic Table.

What are the following elements used for?

Sulfur – Matches (burns easily)
Iron – Bridges (strong)
Copper – Saucepans (conducts heat)

The Air We Breathe

Air contains a mixture of gases. Label the gases in the pie chart below.



Nitrogen – 78.0%
Oxygen – 20.9%

Metals and Non-Metals

Summarise properties of metals and non-metals below.

Metals	Non-Metals
High melting points	Low melting points
Strong and flexible	Brittle
Malleable	Not shiny
Good conductors of heat	Poor conductors of heat
Good conductors of electricity	Poor conductors of electricity

Name three metals that are magnetic.

- Iron
- Nickel
- Cobalt

There are some exceptions to these property trends.
Graphite (a non-metal) conducts electricity and silicon (a non-metal) is shiny.

Word Equations

Complete the equations below.

iron + sulfur → iron sulfide
(reactants) (product)

1. Hydrogen + oxygen → water
2. Sodium + chlorine → sodium chloride
3. Copper + oxygen → copper oxide
4. Zinc + oxygen → zinc oxide

Making Compounds

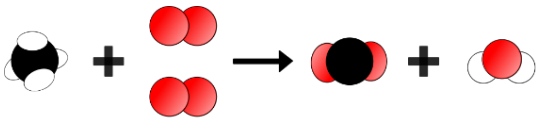
The first stage in forming compounds often involves heating a mixture of elements. Bonds then form between atoms from the different elements.

What are the five signs of a chemical reaction?

1. Bubbling/effervescence
2. Colour change
3. Odour released
4. Temperature change
5. Precipitate (a solid) formed in the solution

Chemical Reactions

Reactants make products.
If two non-metals join together they form a covalent compound.



$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

What is the difference between physical changes and chemical changes? A chemical change causes a new substance to form, a physical change only causes the matter to change form, not change chemically.