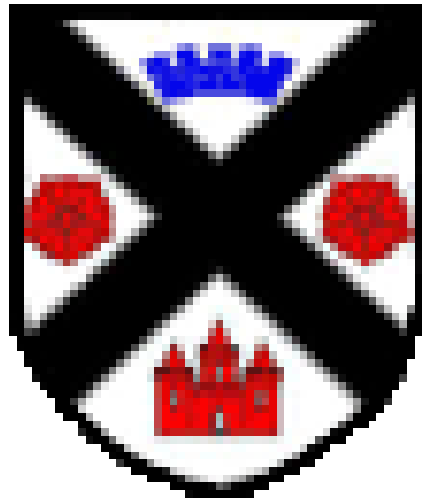


S1 Physics CfE Pupil Summary Notes



Gleniffer High School

Name: _____

Energy types and changers

Energy cannot be made or destroyed but is changed from one type into another.

Energy is measured in the unit called **Joules**.

The types of energy are listed below:

√ **LIGHT**

√ **SOUND**

√ **ELECTRICAL**

√ **KINETIC**

√ **HEAT**

√ **CHEMICAL**

√ **POTENTIAL**

Energy Changers

A toaster changes electrical energy into heat energy.

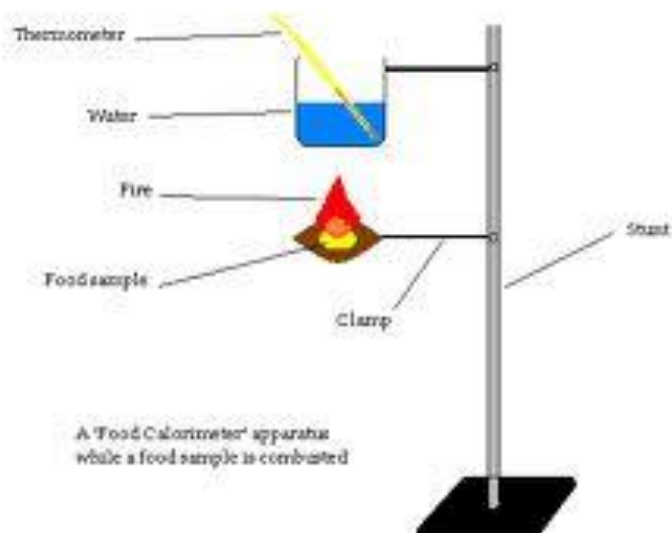


A hair dryer changes electrical energy into heat and sound energy



Measuring the energy content of food:

The chemical energy in food can be changed to heat energy and measured using the apparatus below.

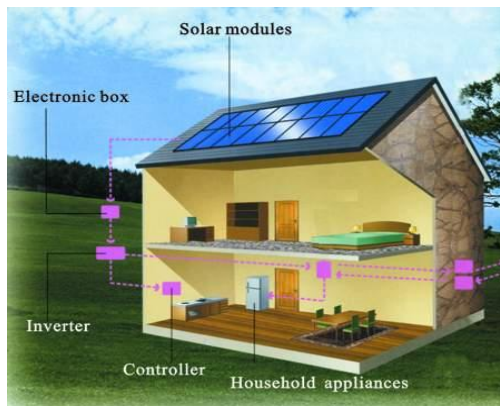


Energy sources can be classified as renewable and non-renewable.

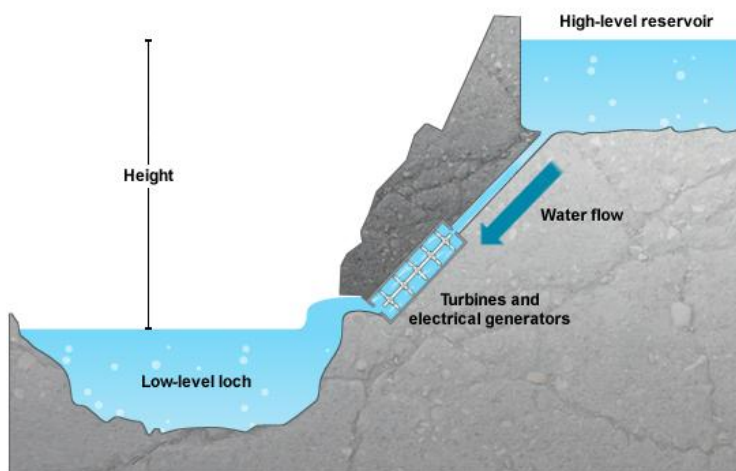
Renewable energy sources

Examples of **renewable energy** include:

- ✓ Solar cells
- ✓ Wind turbines
- ✓ Hydroelectric power

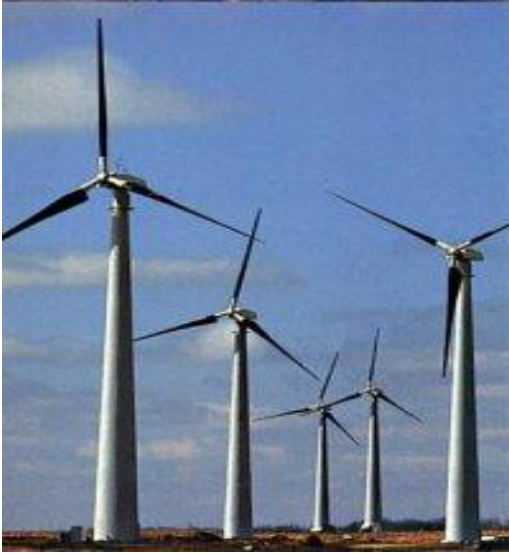


The **solar cells** convert the **light energy** from the sun into **electrical energy** for our homes.



In **hydroelectric power stations**, the water runs down pipes (**potential to kinetic energy**) to turn the turbine

The turbine is connected to a generator to produce electricity (**kinetic to electrical energy**)



The **wind turbines** are turned by the wind. The turbine is connected to a generator which produces electricity.

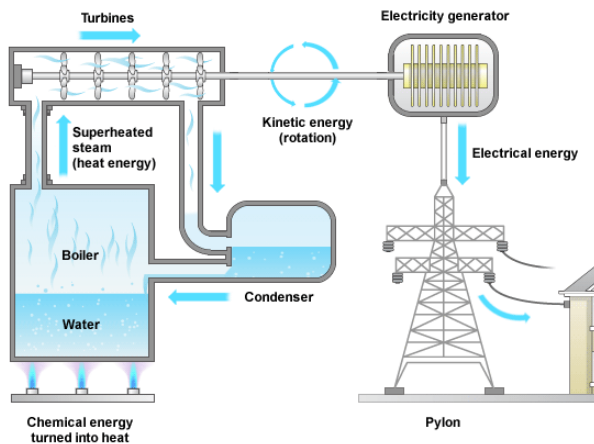
(**kinetic** to **electrical**)

Non - renewable energy sources

Example of non renewable energy sources include:

- ✓ Coal
- ✓ Oil
- ✓ Gas
- ✓ Nuclear

Coal, oil and gas are called fossil fuels and are **running out**. Therefore we need to look for alternative sources of energy.



The fuel (coal oil or gas) is burned in a furnace. This releases heat which turns turbines. The turbines are connected to a generator producing electricity.

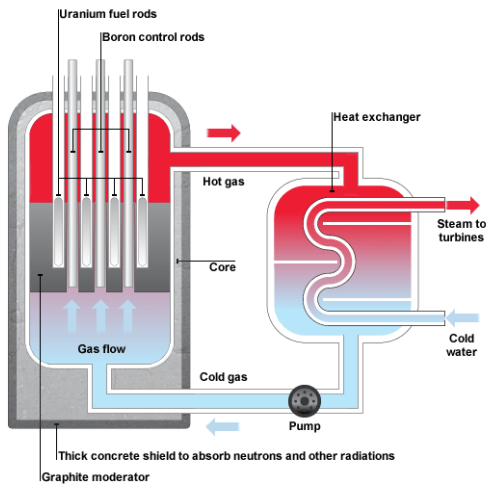
Problems with burning fossil fuels

The carbon stored in fossil fuels is released as carbon dioxide when they are burnt. Burning fossil fuels has increased atmospheric pollution. This is thought to cause global warming.

Problems with renewable energy sources

Expensive to set up and don't always generate enough energy

Nuclear Energy



In **nuclear** energy, the uranium fuel undergoes a reaction to produce heat. The heat is used to change water into steam. The steam turns the turbines which are connected to a generator, making electricity.

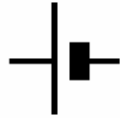
Problems with nuclear energy sources

Nuclear power can generate waste which is radioactive and needs careful management

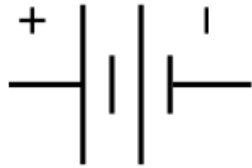
Electrical Circuits

The cell stores **chemical energy** and transfers it to **electrical energy** when a circuit is connected.

When two or more cells are connected together we call this a **Battery**.



CELL



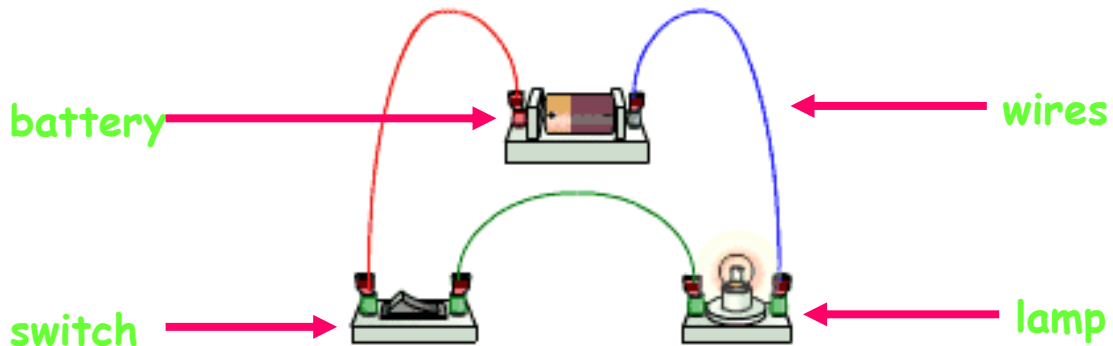
BATTERY

In cells, chemical energy is used up pushing a current round a circuit.

An **electric current** is a flow of particles called **electrons** flowing through wires and components.

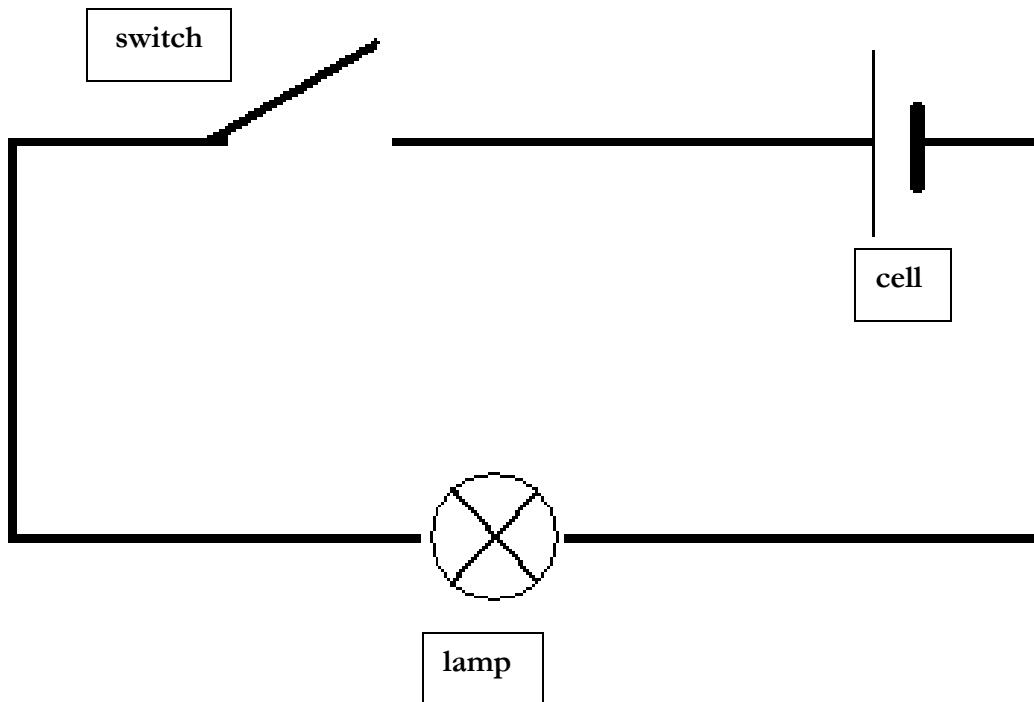
A simple circuit

Here is a simple electric circuit. It has a battery, a lamp and a switch.

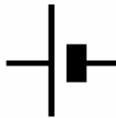


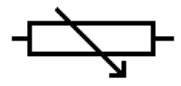

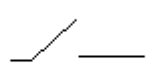


To make the circuit, these components are connected together with connecting wires. The switch needs to be closed to complete the circuit. When the switch is closed, the lamp lights up. This is because there is a continuous path for the **electric current** to flow around.

Scientists draw electric circuits using symbols.



Complete the table below. The first one is done for you.

Symbol	Name
	cell
	voltmeter
	ammeter
	variable resistor
	bulb
	Switch

Resistance in circuits

Every material has an electrical resistance.

The **ohm** is the unit of resistance, named after school teacher George Ohm.

Factors affecting resistance

Different types of material have different values of resistance. Metals are good conductors. Conductors have small resistance values. Non metals are generally referred to as insulators. However, carbon is a non metal and is a good conductor. Insulators have high resistance values.

A **long** piece of wire has **more resistance** than a short piece of wire.

A **thin** piece of metal has **more resistance** than a thick piece of metal.

Current and resistance

The greater the resistance, the dimmer the bulb will become. This is due to the **reduction in current** flowing through the circuit. Resistors in a circuit can be used to slow down the current. Thicker wires speed up the current more and have a lower resistance.

Some resistors have a fixed value. The symbol for a fixed value resistor is:



Others i.e. variable resistors, can be used to change the current in the circuit by changing the length of the resistor (**the longer the wire, the greater the resistance**). They are used in dimmer switches and to control the volume in a stereo.

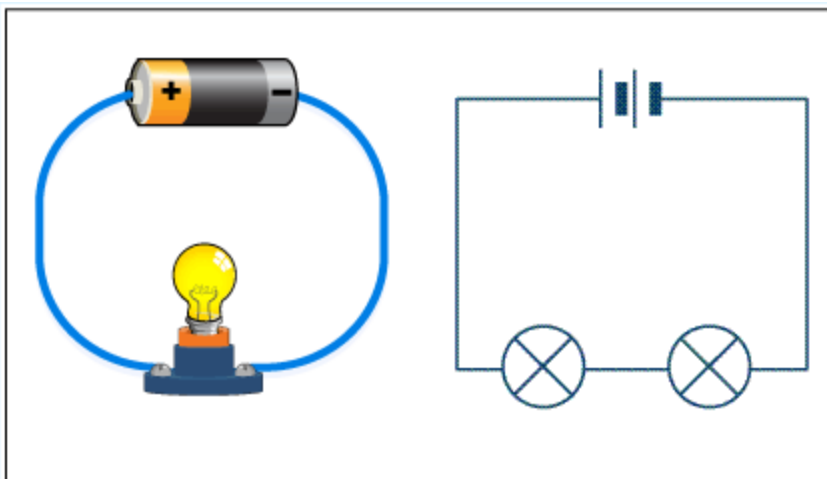
The symbol for the variable resistor is



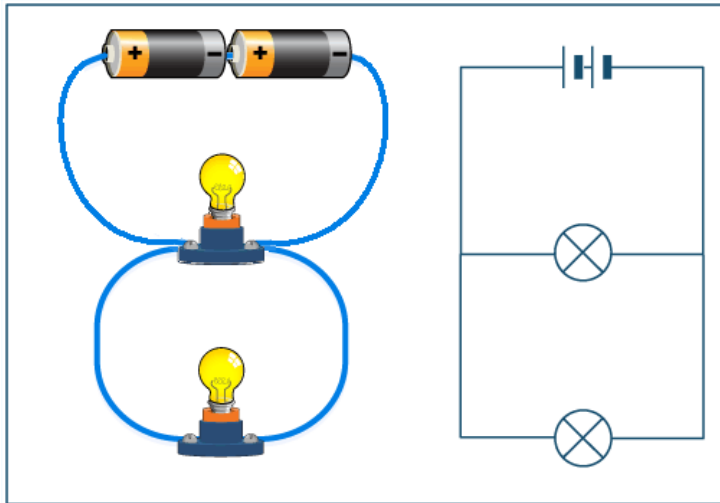
Series and parallel circuits

There are two types of electrical circuits;

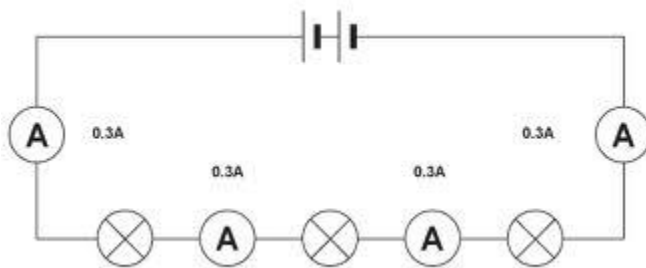
Series



Parallel



The components are connected end-to-end, one after the other.
They make a simple loop for the current to flow round.
If one bulb 'blows' it breaks the whole circuit and all the bulbs go out.
In a series circuit, the current is the **same** at all points in the circuit.
This is because there is only one path for the current to flow.

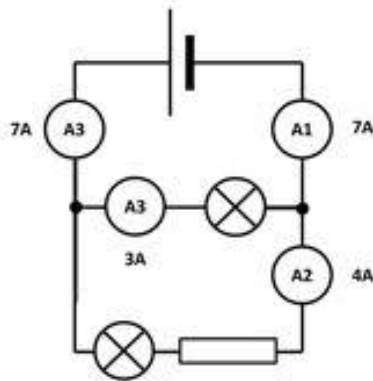


Parallel Circuits

The components are connected in parallel with each other.
The current has a choice of routes

If one bulb breaks there is still be a complete circuit to the other bulb so it stays alight.

In a parallel circuit, the current is split between the components.



Friction

Friction is a force between two surfaces that are sliding, or trying to slide across one another, for example when you try to push a toy car along the floor.

Friction always works in the direction opposite from the direction the object is moving, or trying to move. It always slows a moving object down.

The amount of friction depends on the materials from which the two surfaces are made. The rougher the surface, the more friction is produced.

For example, you would have to push a book harder to get it moving on a carpet than you would on a wooden floor. This is because there is more friction between the carpet and the book than there is between the wood and the book.

Friction also produces **heat energy**. For example, if you rub your hands together quickly, they get warmer.



Friction can be a useful force because it prevents our shoes slipping on the pavement when we walk and stops car tyres skidding on the road.



Ice causes very little friction, which is why it is easy to slip over on an icy day. But this is a good thing for ice skating and sledging



Sometimes we want to reduce friction. For example, moving parts inside a car engine are lubricated with oil, to reduce friction between them. The oil holds the surfaces apart, and can flow between them. The reduced friction means there is less wear on the metal, and less heat energy produced.

By reducing friction, we can make cars more energy efficient.

