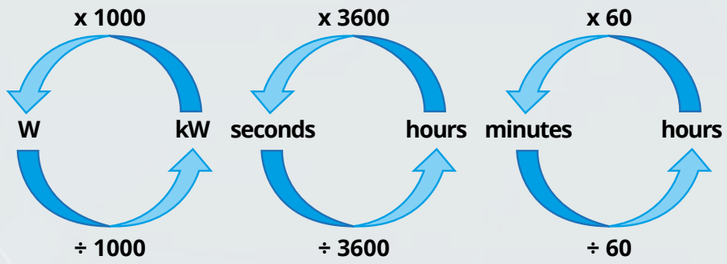
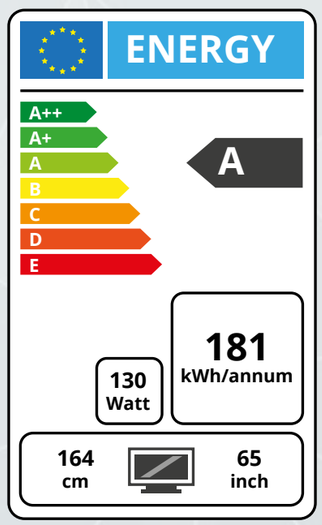
The amount of energy used in the home is measured in kilowatt hours (**kWh**), also known as **Units**, where 1 kWh is equal to the energy converted by a 1 kW device for 1 hour.

In order to calculate the cost, these equations are used:
Units used (kWh) = Power (kW) × time (hours)
Cost = Units used × Cost per unit
Both equations are given on the equation sheet, **but it is important that you can convert between units correctly**. Often power is given in Watts and time in seconds or minutes.

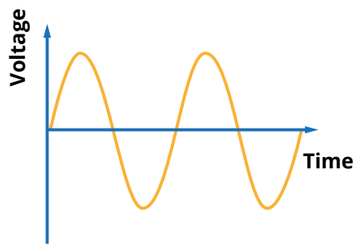


The **efficiency** of a device is shown on a scale like this - the more efficient a device, the better it's rating will be.

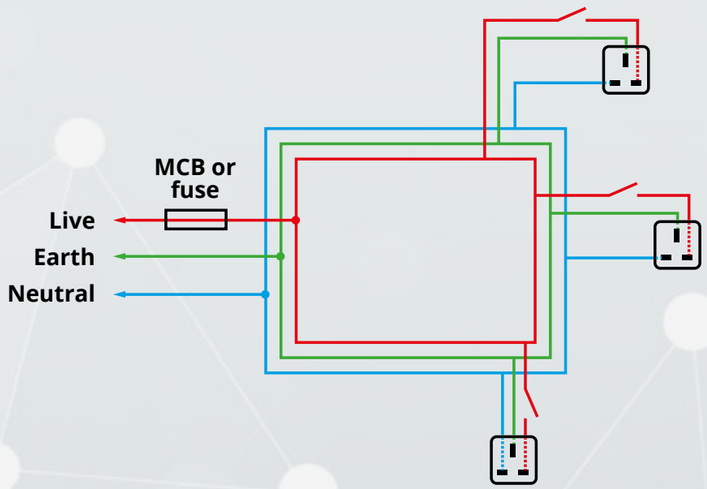
This is important as it will help **compare** devices that do the same thing. For example, two televisions of the same size and picture quality but different energy ratings will have a different cost to use.



Electricity can be supplied in two ways; with an Alternating Current (AC) or a Direct Current (DC).

AC	DC
	
Voltage constantly changes size and the current constantly changes direction.	Voltage and current have a constant size and direction.
Supplied by the National Grid.	Supplied by batteries.

The electrical circuits in your home are connected using a **ring main** circuit.



The advantages of a ring main circuit are:

- The current can travel two ways so you can make the wires thinner and have a lower current in each part.
- You can add more sockets anywhere on the ring and each will have the same voltage (230V).

There are 3 wires in the ring main circuit:

1. **Live** – this carries a current into the house at a **high voltage**.
2. **Earth** – operating normally this wire carries no current.
3. **Neutral** – this completes the circuit and has the **same current** as the live wire but a lower voltage.

The earth wire is connected to the casing of any device with a **metal** case. This is so that *if the live wire touches the casing* due to a **fault**, then the *current will travel **safely** to the earth through the earth* wire rather than through a person who touches the casing.

There are three other safety devices used in these circuits:

Fuse	Stops the **current** if it becomes too **large**. It does this by melting a wire in the fuse. This means the fuse must be replaced once it has 'blown'. This prevents the device overheating.
Miniature circuit breaker (MCB)	Stops the **current** if it becomes too **large**. Reacts more **quickly** and can be **reset**. This prevents the device overheating.
Residual current circuit breaker (RCCB)	Stops the current if the current in the **neutral wire is different to the live wire** (*remember, when the circuit is operating normally the current will be the same in both).* Reacts to a **very small** difference, reacts very **quickly** and can be **reset**. This will protect the user from a serious electric shock.