Electricity In the household

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Contents

Topic-Electricity in household

In this topic there will be :

- Mains electricity
- National Grid
- Wiring of a plug
- Safety with electrical devices
- Equations needed

Current

Current

DC = Direct current (Flows in a single direction)

AC = Alternating current(Keeps fluctuating)

AC = Alternating potential difference

What does frequency mean?
How often the **current completes** a **certain amount of cycles** of **current alternation a second.**
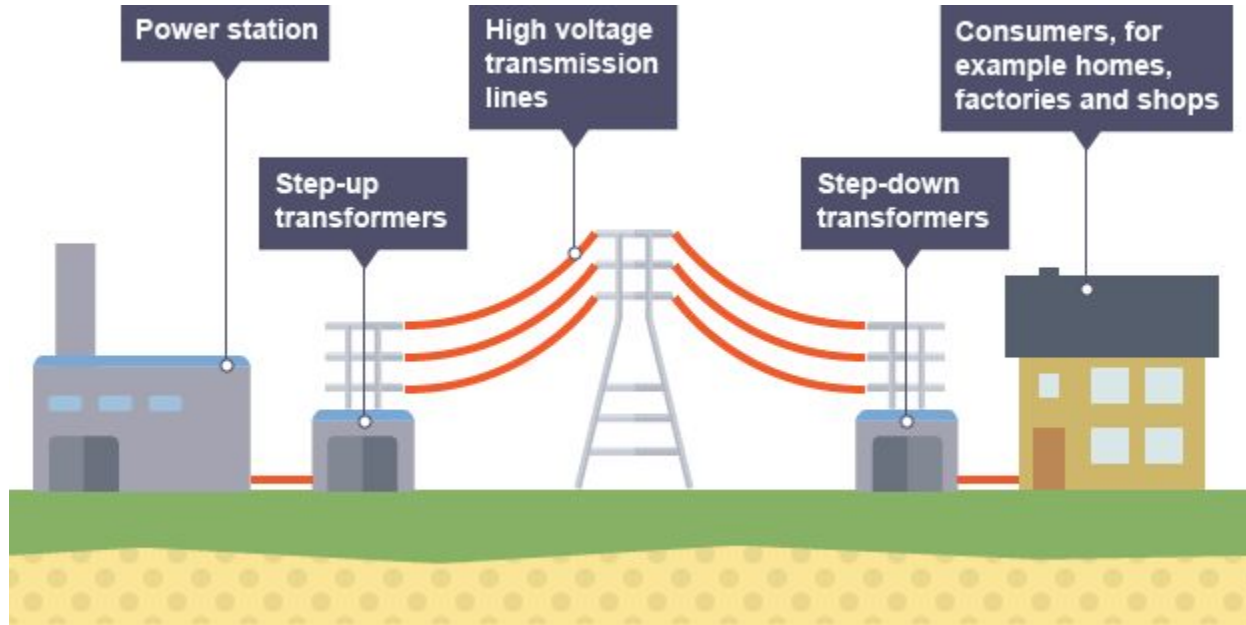
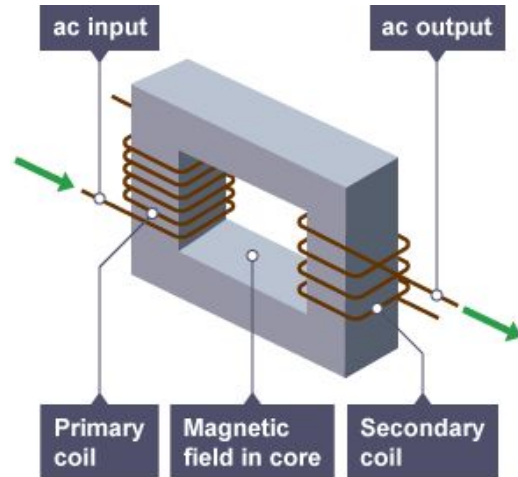E.g 50Hz = 50 full cycles a second

The National Grid

Definition

A **network** of **wires** and transformers **linking power stations** to **homes** and **businesses**

- Throughout the day, **electricity usage**(demand) **changes**.
- Power Stations have to produce enough electricity for everyone(**meeting the demand**)

The National Grid

Power station

Step-up transformers

High voltage transmission lines

Step-down transformers

Consumers, for example homes, factories and shops

Transformers

The **number of turns** on each the transformer will determine if it is a **step-up** or **step-down** transformer
- **Step-up** = more turns on **secondary coil**
- **Step-down** = more turns on **primary coil**

Transformers

Step-up transformer
- Increases voltage
- Decreases current
- Less energy lost to heat
  - As there is so much energy, the wires heat up. BY reducing the current, there is less energy lost to heat

- Increases the voltage of the AC supply

Step down transformer
- Decreases voltage
  - Reduces voltage to 230v so it is safe for homes
- Increases current

- Decrease voltage of the AC supply

Wiring of a plug

Earth wire

Neutral wire

Cable grip

Fuse

Live wire
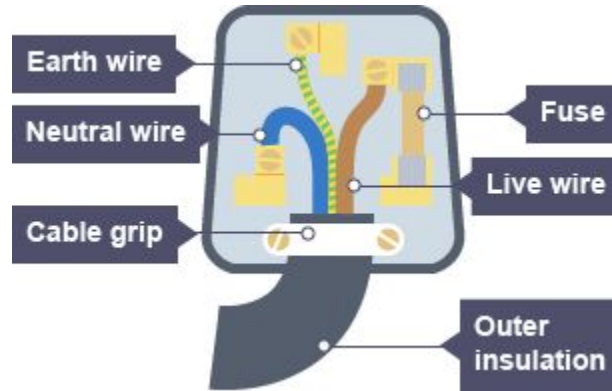
Outer insulation

Features of a plug

Features of a plug	Function
Outer Insulation	All wires in the cable are bundled together and wrapped in an extra plastic insulation for safety
Cable grip	Holds cable tightly in place
Live wire(BROWN)	Copper wire which allows the current to enter the device
Fuse	Safety precaution which melts if current gets too high
Neutral wire(BLUE)	Completeness circuit
Earth wire(GREEN/YELLOW)	Provides a path for the current to ground if there is a fault

Fuses

- Domestic Appliances are fitted with **fuses to protect them from current surges**

- The **fuse rating must** be **higher** than the **current flowing through the appliance** or it will **blow every time** it is plugged in

- We use **power ratings** to calculate the appropriate fuse

Current

- **P= IxV**
- **E= VxIxT**
- **E= QxV**
- **V= IxR**
- **E= PxT**
- **Q= IxT**

E= Energy (Joules)
Q= Charge (Columbus)
V= Potential difference (Volts)
I= Current (Amperes)
R= Resistance (Ohms)
P= Power (Watts)
T= Time (Seconds)