

# Electricity and Magnetism

## NOTES

Electricity and magnetism are closely related.

Both are caused by negative and positive charges in matter.

Electricity can produce magnetism, and magnetism can create electricity.

**Electricity** is the interaction of electric charges.

An **electric charge** is a physical property of protons and electrons.

Atoms can gain or lose electrons.

Atom with equal number of protons and electrons = no charge.

Atom with more protons than electrons = net positive charge.

Atom with more electrons than protons = net negative charge.

## **Law of electric charges**

states that like charges repel and opposites attract

The strength of the electric force between charged objects depends on the size of the charges and the distance between them.

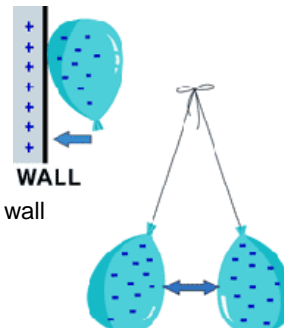


## **Static electricity** is the build up of electric

charges on an object. (can occur by rubbing)

For example: if you rub a balloon against your head, then electrons from the atoms that make up your hair get transferred to the balloon.

The balloon becomes negatively charged and your hair becomes positively charged. If you hold the balloon next to your hair, your hair will stand on end.



Same with balloon on the wall

**Electric discharge** (static discharge)

-the sudden and brief flow of electrons

Examples: The small shock you get when you touch a metal doorknob after shuffling your feet on carpet.

Lightning is an example of electric discharge on a grand scale.



**Current electricity** - the continuous flow of electric charge.

Conductors – good at carrying electric current  
examples: copper and aluminum

Insulators – not good at carrying electric current  
examples: rubber, wood, glass, air

**Two types of current**

Direct current (DC) – current in which the electric charges move in one direction.

Alternating current (AC) – current in which the electric charges flow in one direction, then in the reverse direction, over and over again.

## Electric Circuits

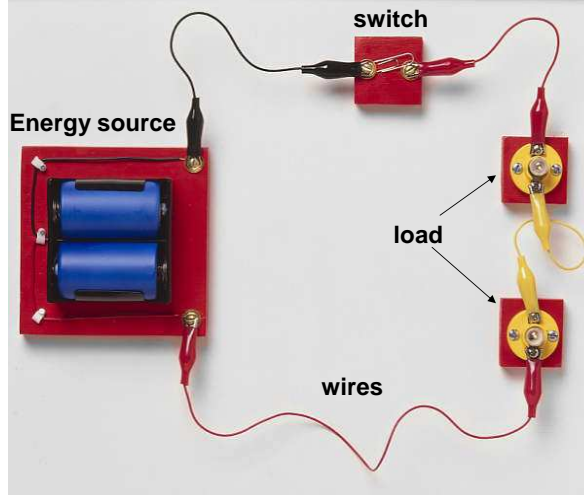
Electric current flows through a path called a circuit.

Closed circuit – path with no break in it

Open circuit – path with a break in it

### Parts of a Circuit

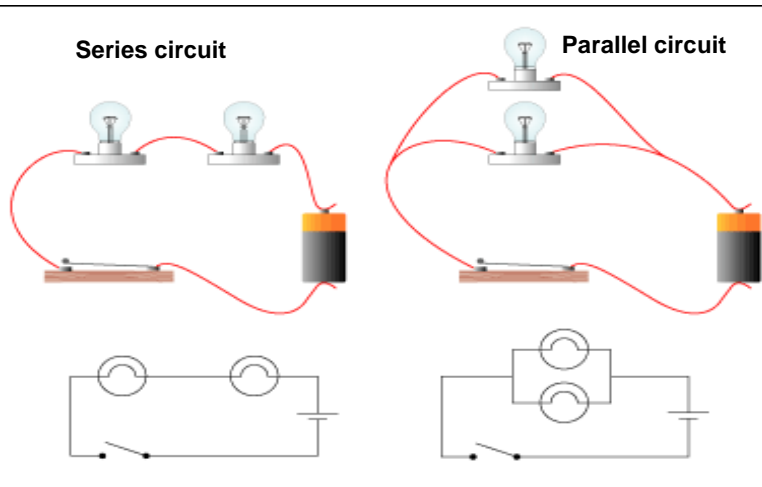
1. Energy source
2. Load
3. Wires
4. Switch



## Types of Circuits

Series circuit – the loads in the line flow from one load to the next in a single line.

Parallel circuit – the current is divided by the different loads.



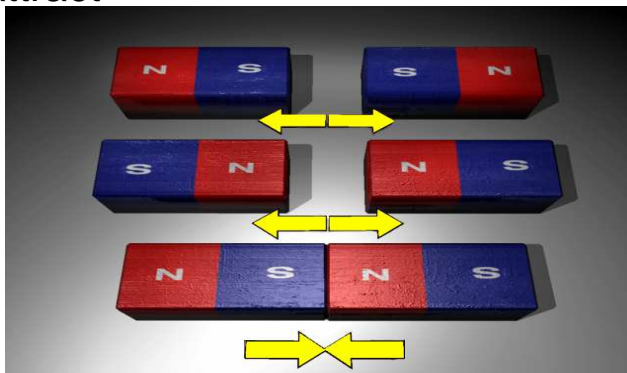
## Magnetism

Magnet – any material that attracts iron

Poles – regions in a magnet where the magnetic force is strongest

Like poles repel

Opposite poles attract



Electromagnetism is magnetism resulting from electric charge in motion.

Electric magnet - current passing through the coils of wire magnetize the iron nail. (more coils around wire equals stronger magnetic field)

