

Chapter 4

Electricity and Magnetism

Ume

Vocabulary:

Electric charge: A property of the particles that make up matter. Can be positive or negative

Static electricity The buildup of electric charges in one place

Electric circuit: A continuous pathway that carries an electric current. An electric circuit is a closed circuit.

Open circuit: An electric circuit that has been broken, so that there is no complete path for current flow

Conductor: A material through which heat and electricity flow easily, such as most metals and salt water.

Insulator: A material through which heat and electricity do NOT flow easily, such as rubber, glass, and plastic.

Series circuit: An electric circuit with only one path for current.

Parallel circuit: An electric circuit with two or more paths for current.

Electromagnet: A magnet that has coils of current-carrying wire around an iron core.

Power Source: Provides energy source to power the movement of the current.

Ex: battery

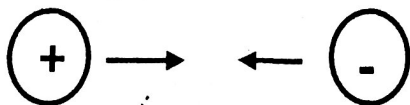
Lesson One: *What is static electricity?*

Electric Charges: Two kinds: positive and negative. When there are the same number of positive and negative charges, they cancel each other out and are balanced, which is called neutral.

Negatively charged: When an item has more negative than positive charges.

Positively charged: When an item has more positive than negative charges.

Opposite charges attract or pull toward each other.



Charges that are the same repel or push away from each other



Lesson Two: *What makes a circuit?*

In static electricity, an item becomes charged when it gains or loses negative charges.

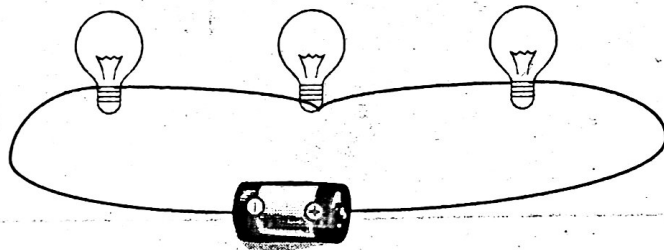
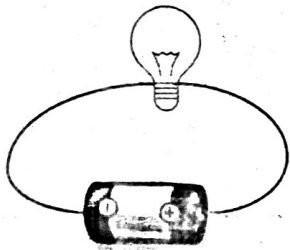
Then the charges don't move unless they have a path, such as your fingertip to the metal door knob

In current electricity, electric charges have a path to follow, so they flow or move.

Current electricity is a steady flow of moving charges.

Current electricity is more useful to people than static electricity because it can be controlled more easily.

A series circuit is the simplest type of electric circuit. A series circuit only has one path for its current to flow.



The electric current moves from the battery, or other power supply, through the wire. Next, it passes through each device, then returns to the battery.

Removing any device (such as a light bulb), breaks the circuit and all devices stop working.

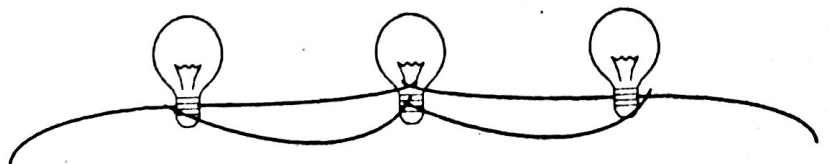
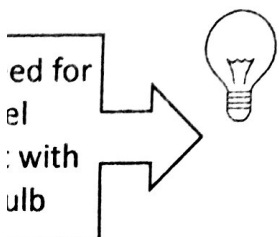
Current flows in a series circuit only when everything is connected at the same time.

In a series circuit, if you add more light bulbs the lights will get dimmer.

Series circuits are only used in simple devices, and not houses and buildings because:

- 1. If one device stopped working, everything would stop working.**
- 2. All devices would have to be on all of the time.**

Parallel Circuits have more than one path for the current to follow.



If something blocks the charge on one path, the charges flow along another path.

In a parallel circuit, if you add light bulbs the brightness will stay the same.

Parallel circuits are used in homes and buildings because if one device is not on or not working, it will not cause the other devices to go off.

Lesson Three: *What are conductors and insulators?*

A conductor is a type of material through which negative charges can move easily, such as copper, silver, iron, and most other metals.

Negative charges don't really "flow" through a conductor, they are actually pushed through by the other charges using the energy of the battery or other power source.

An insulator is a material that resists the flow of electricity, such as rubber, plastic, and wood.

Electrical appliances have both conductors and insulators. The conductors allow the current to flow, while the insulators protect people from the electrical charges.