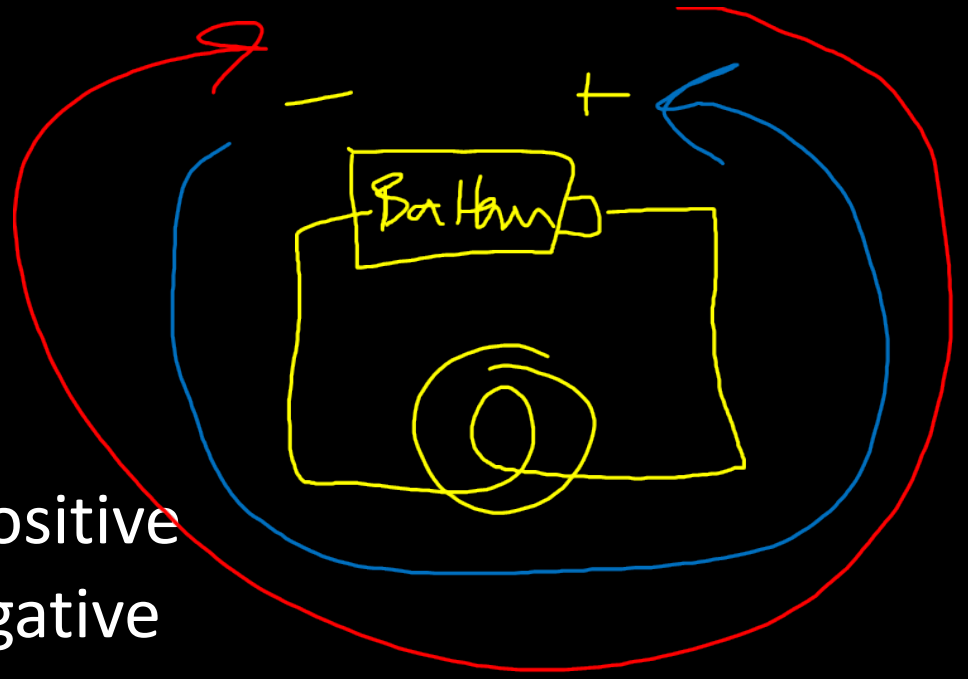
Electricity

Electricity

- What is electricity?
  - The continuous flow of electrons
  - Electrons flow from negative to positive
  - Current flows from positive to negative

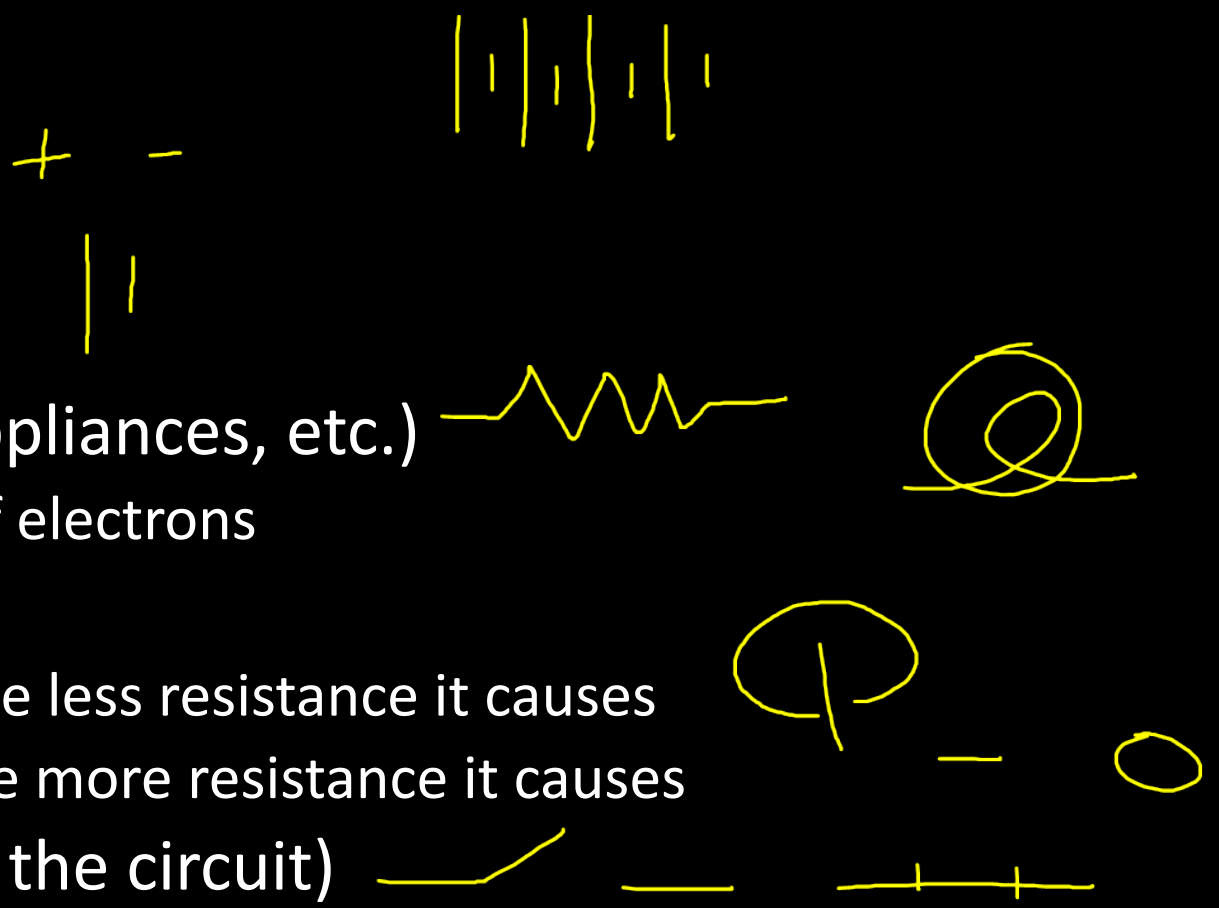


Electricity

- Types of Current
  - Alternating Current (AC)
    - Flow of electrons changes directions at regular intervals
    - Capable of traveling long distances
  - Direct Current (DC)
    - Electrons always flow in the same direction
    - Not capable of traveling as far
- Simple Circuits
  - A circuit is a closed path through which electrons can flow

Electricity

- Parts of a Circuit
  - Power Source (battery)
  - Resistor (light bulbs, appliances, etc.)
    - Slows down the flow of electrons
  - Wire
    - The thicker the wire, the less resistance it causes
    - The longer the wire, the more resistance it causes
  - Switch (opens & closes the circuit)



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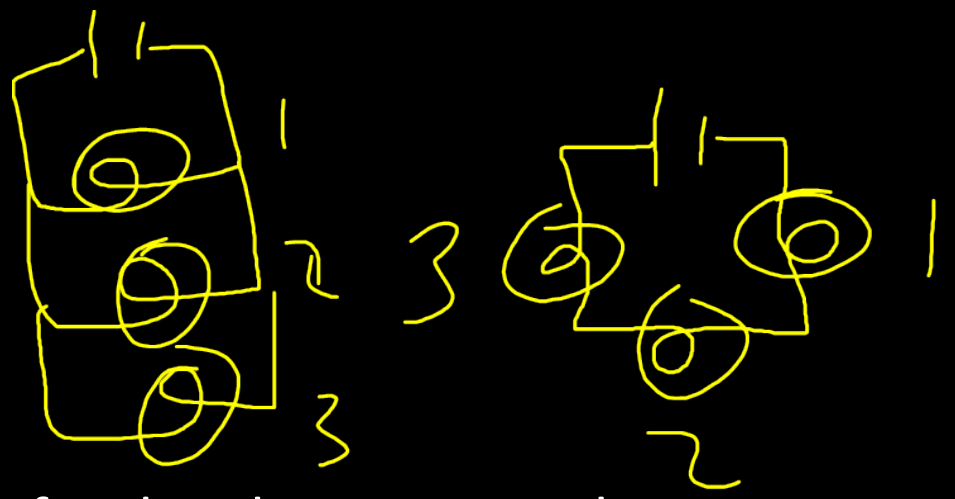

- Types of Circuits
  - Series Circuit
    - Only one pathway for the electrons to take
    - If any part of the circuit breaks, the electrons cannot flow
  - Parallel Circuit
    - Electrons have more than one path to take
    - If part of the circuit breaks, the electrons has an alternative path to take

Conductors & Insulators

- Electrical conductor: material through which charge can flow easily
  - Example: Metals
- Electrical insulator: material through which charge cannot easily flow
  - Examples: Plastic, rubber, wood, air
- Superconductors: very cold solids that conduct electricity extremely well
- Semiconductors: conduct electricity only under the right conditions

Static Electricity

- Static electricity is the study of the behavior of electric charges
- Ways a net charge can build up on an object or transfer between objects
- The law of conservation of charge says that the total charge is the same before and after the transfer occurs

Methods of Charging

neutral + neutral → + ⋮ −

- Friction
  - Some objects have a greater attraction for electrons
  - When two objects rub together, the one with the greater attraction gains electrons (becoming negative) and the other object loses electrons (becoming positive)
  - Examples: Rubbing a balloon on your head & walking across a carpet

Methods of Charging

+ neutral → + +

− neutral → − −

- Contact
  - When an uncharged object comes in contact with a charged object, part of the charge may be transferred to the uncharged object, causing it to become charged
  - Example: Putting your hand on a Van de Graff generator

Methods of Charging

+ 's − → neutral / natural

- Induction
  - Transferring a charge without contact between materials
  - Occurs when the positive and negative charges in a object move as a result of a charge being nearby
  - Example: Reaching for a doorknob after walking across the carpet

Static Discharge

- Occurs when a pathway through which charges can move suddenly forms
  - Examples: You get shocked when you reach for the doorknob after walking across a carpet and lightning