

Week 35 – SCIENCE NOTE PAGE

Circuits

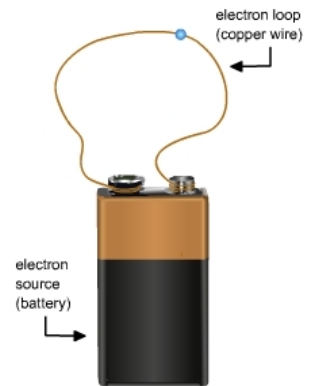


Circuits: Keeping the Flow

- Electric Circuit: a continuous, looped conducting pathway around which electricity flows

Circuits

- An electric currents can only exist if electrons are **flowing**
- The current needs a **conductor** through which to flow
- Because the conductor always has some resistance, electrons continue to flow only if a constant **force** is pushing on them
- If the conductor ends at the same place it begins, the **force of repulsion** will continue to keep the electrons moving

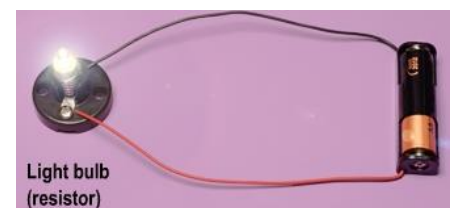


Circuits: Not Just a Bunch of Wires

- To get electrons flowing, you need a **source** of electrons that will push into the loop and cause the current to flow
- **Batteries** – a common sources of electrons
 - They store TWO difference chemicals:
 - One tends to lose electrons
 - One tends to gain electrons
 - This creates an electric **field**, with **one pole being more negative** and the **other being more positive**
 - When a conductor (ex. Copper wire) is connected to the two poles, the electrons naturally begin to flow
- Electrons ALWAYS flow from **negative** to **positive**

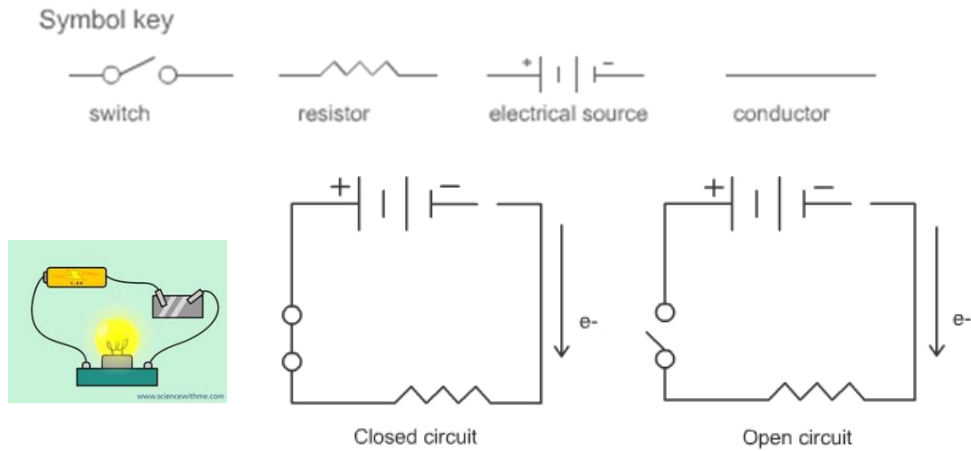
Resistors: Resisting the Flow

- **Resistor:** a resistor is anything that **resists** the flow of electrons
 - As resistance increases, current flow decreases
 - As resistance decreases, current flow increases
- **Example:** Add a light bulb to the circuit and the filament inside the bulb will resist the flow of electrons, **converting** energy into light and heat
- **How will you know if you have successfully created a circuit with flowing electricity?**
 - If you add a resistor, you will know electricity is flowing because the resistance in the circuit will cause the energy to be converted into **heat** or **light!**



Open vs. Closed Circuits

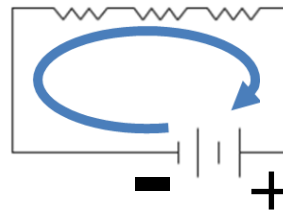
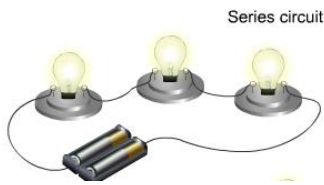
- **Closed Circuit:** electric current will only flow if there are **NO breaks** in the circuit
- **Open Circuit:** the flow of electric current stops at the point where the circuit is **broken**
- **Switches** can be used to control the flow of electrons by opening and closing the circuit



Series vs. Parallel Circuits

Series Circuits:

- Uses **ONE** continuous wire from the battery through the light bulbs.
- The **GOOD**: all current flows through **EVERY** device
- The **BAD**:
 1. if any **ONE** bulb burns out, then the circuit is **BROKEN** (opened) and **ALL** the bulbs/devices will go out.
 2. Each bulb gets dimmer because the voltage drops after each resistor



Parallel Circuits:

- Has **many** sets of wires, creating multiple paths through which current can flow.
- **The GOOD**:
 1. if one bulb burns out, the circuits will **NOT** be **broken** and will remain closed, and only one bulb will go dark.
 2. The voltage does not change after each resistor so the bulbs are equally as bright
- **The BAD**: **TOO MANY** devices in the circuit will cause it too overload and fail

