



Chapter Sixteen: Electricity

- **16.1 Charge and Electric Circuits**
- **16.2 Current and Voltage**
- **16.3 Resistance and Ohm's Law**
- **16.4 Types of Circuits**



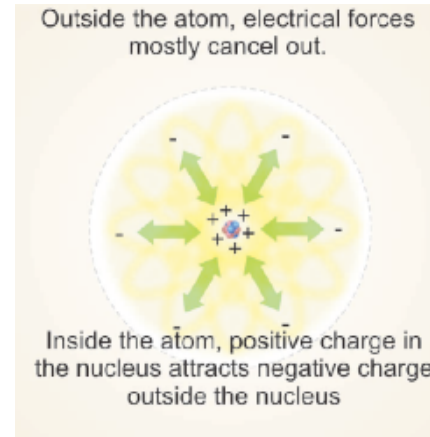
Chapter 16.1 Learning Goals

- Define static electricity and discuss its causes.
- Explain what it means when an object is electrically charged.
- Describe the components of an electric circuit and explain the difference between a closed circuit and an open circuit.



16.1 Positive and negative charge

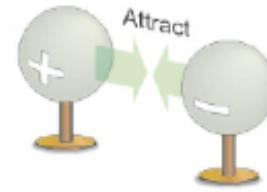
- **Electric charge, like mass, is also fundamental property of matter.**
- **Inside atoms found in matter, attraction between positive and negative charges holds the atoms together.**



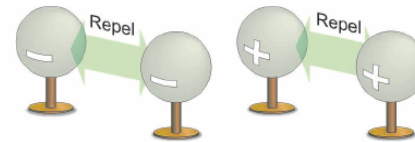


16.1 Positive and negative charge

- Whether two charges attract or repel depends on whether they have the same or opposite sign.



- A positive charge attracts a negative charge and vice versa.



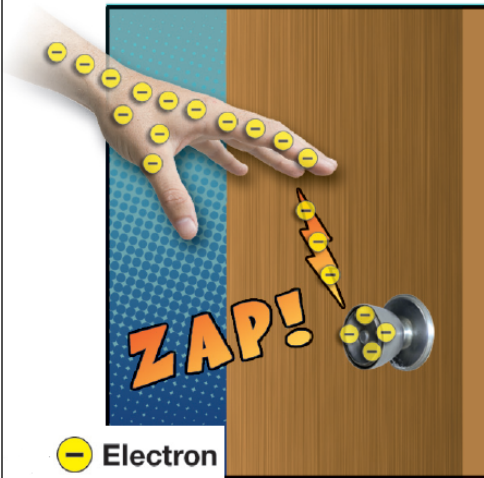
- Two similar charges repel each other.



16.1 Electrical forces

- **The unit of charge is the coulomb (C). The name was chosen in honor of**
- **Charles Augustin de Coulomb (1736–1806), the French physicist who performed the first accurate measurements of the force between charges.**

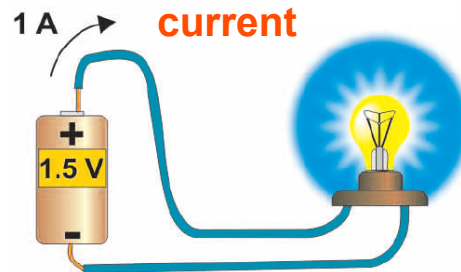
16.1 Static charge



- A tiny imbalance in either positive or negative charge on an object is the cause of static electricity.

16.1 Electric current

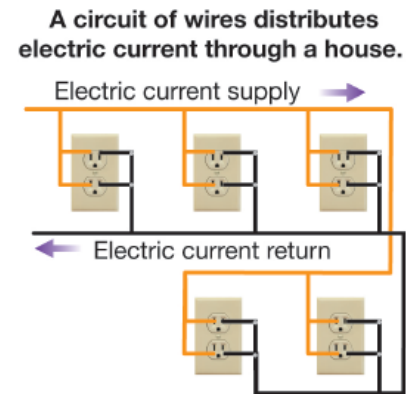
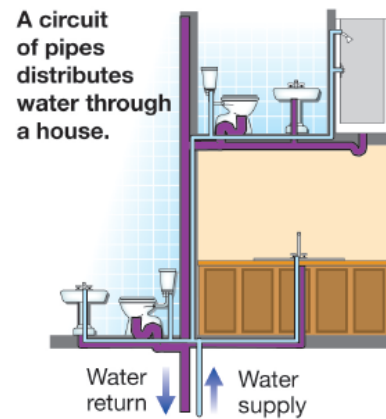
- **Electric current is caused by moving electric charge.**
- **Electric current comes from the motion of electrons.**



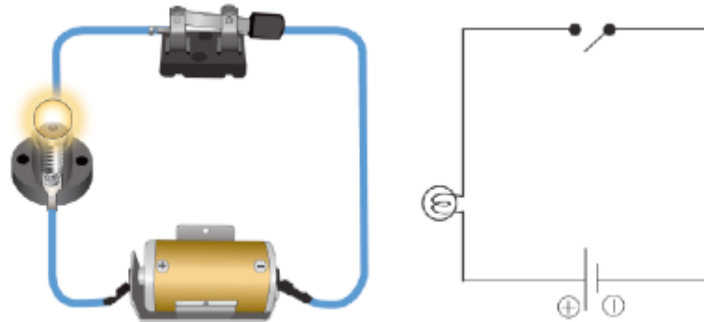


16.1 Electric Circuits

- Wires in electric circuits are similar in some ways to pipes and hoses that carry water.



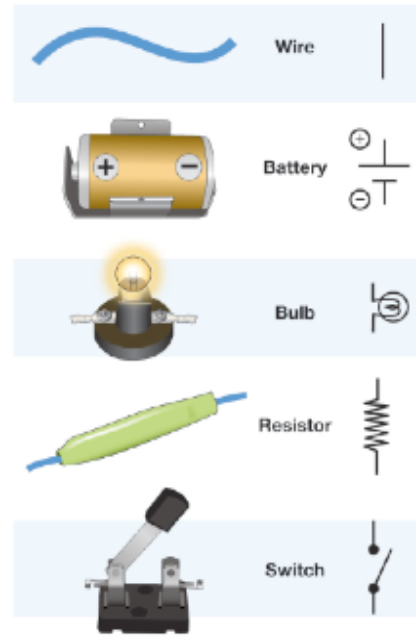
16.1 Circuit diagrams



- **When drawing a circuit diagram, symbols are used to represent each part of the circuit.**

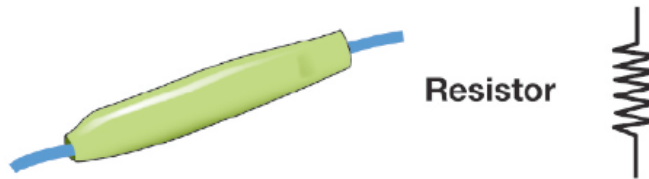
16.1 Circuit diagram and electrical symbols

- Electrical symbols are quicker and easier to draw than realistic pictures of the components.

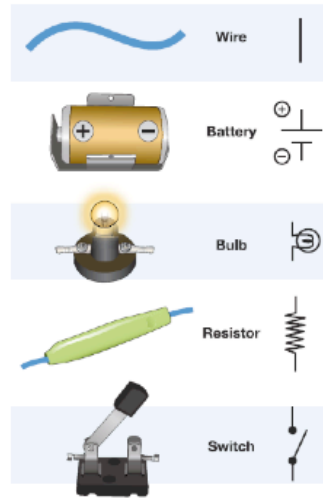
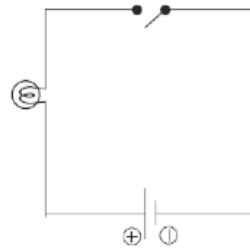
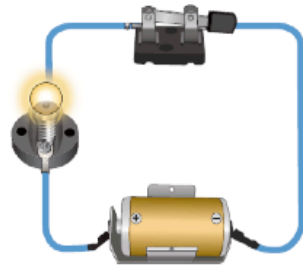


16.1 Resistors

- A resistor is an electrical device that uses the energy carried by electric current in a specific way.
- Any electrical device that uses energy can be shown with a resistor symbol.

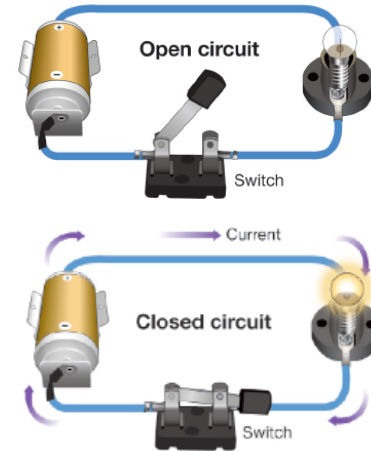


Circuit Diagrams and Electrical Symbols



16.1 Open and closed circuits

- **Current only flows when there is a complete and unbroken path, or a closed circuit.**
- **Flipping a switch to the “off” position creates an open circuit by making a break in the wire.**



16.1 Open and closed circuits

- **Switches are used to turn electricity on and off.**
- **Flipping a switch to the off position creates an open circuit by making a break in the wire.**

