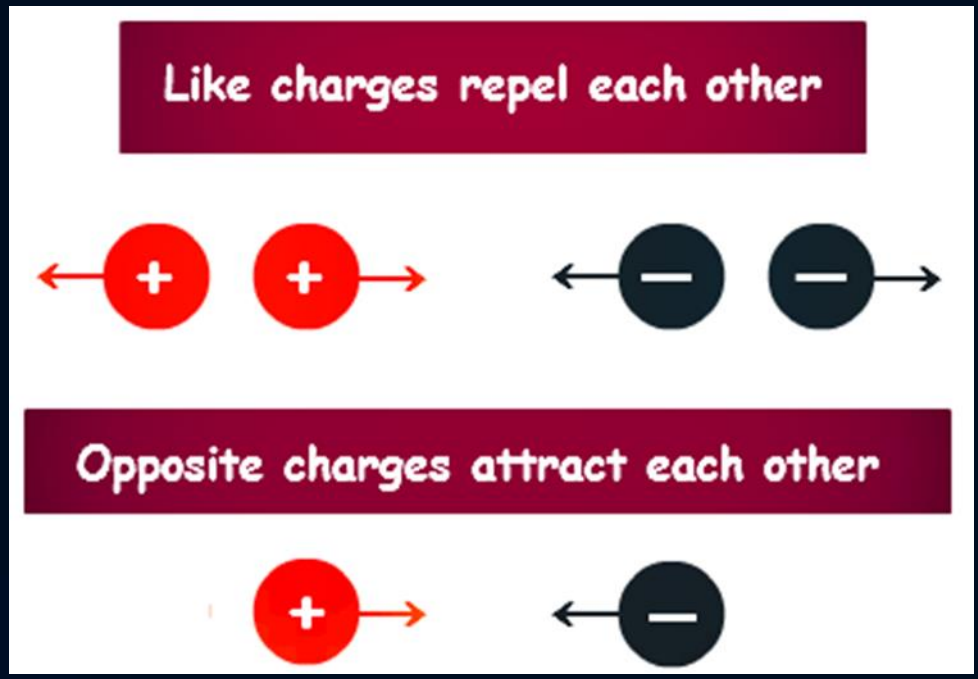
Electricity

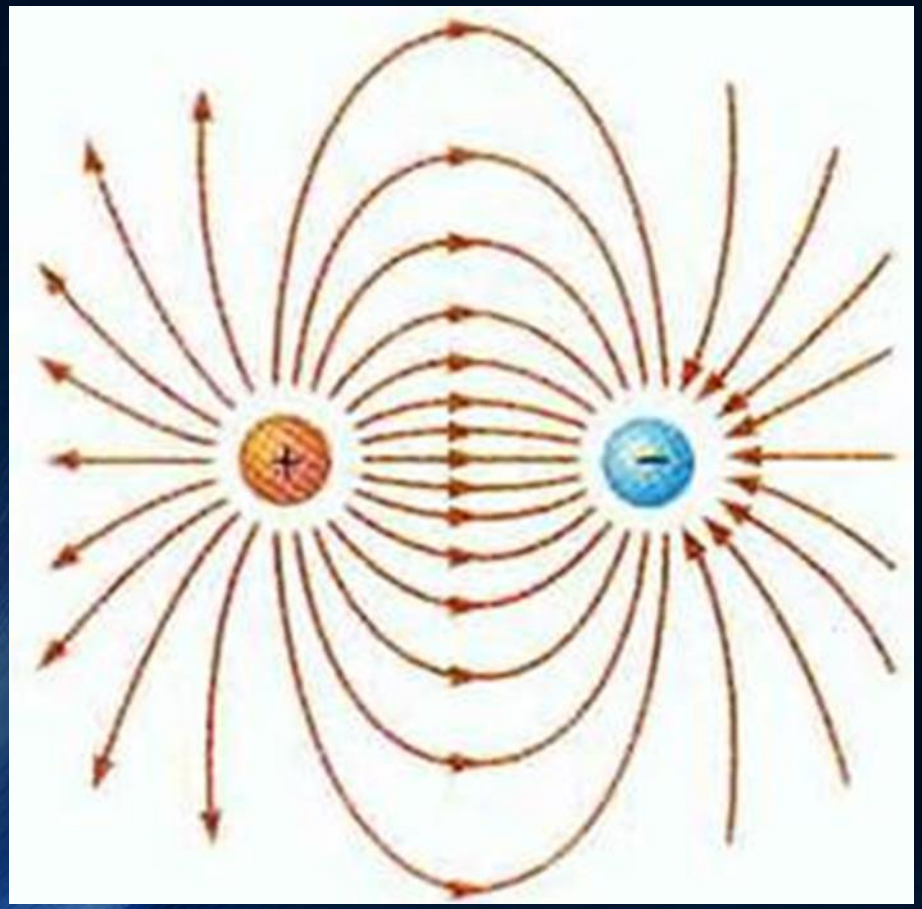
CHAPTER 20

20.1 Electric Charge and Static Electricity

- Charges that are the same repel each other.
- Charges that are different attract each other.



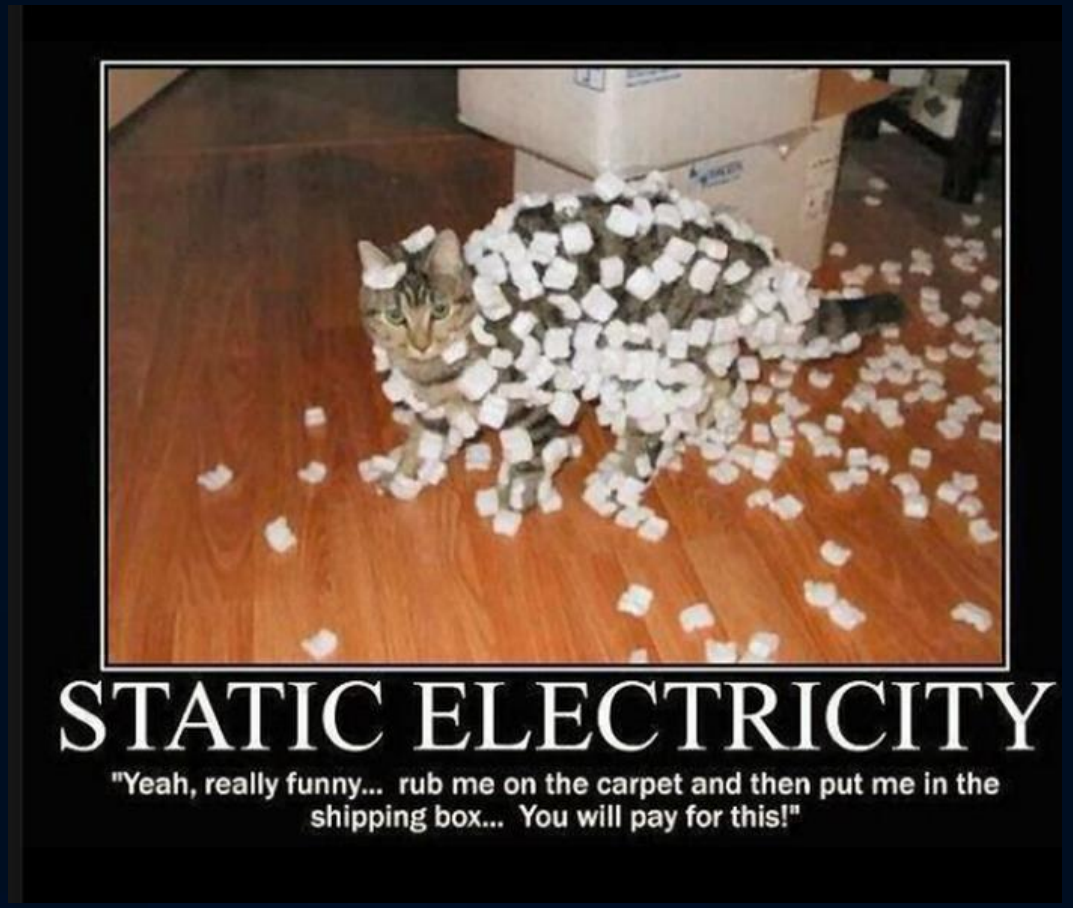
20.1 Electric Charge and Static Electricity



- An electric field is a region around a charged object where the object's electric force interacts with other charged objects.

20.1 Electric Charge and Static Electricity

- Static electricity charge builds up on an object but does not flow continuously.

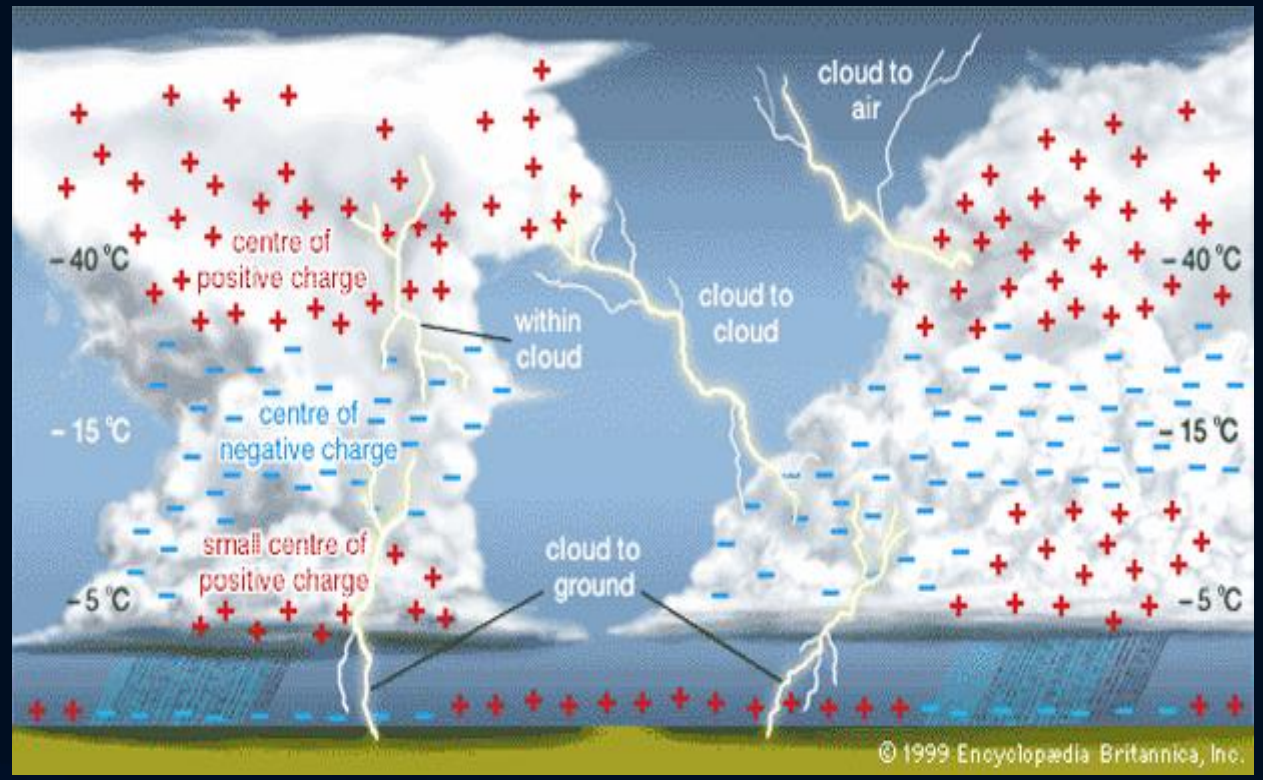


20.1 Electric Charge and Static Electricity

- Static electricity is transferred through charging by friction, by conduction, and by induction.

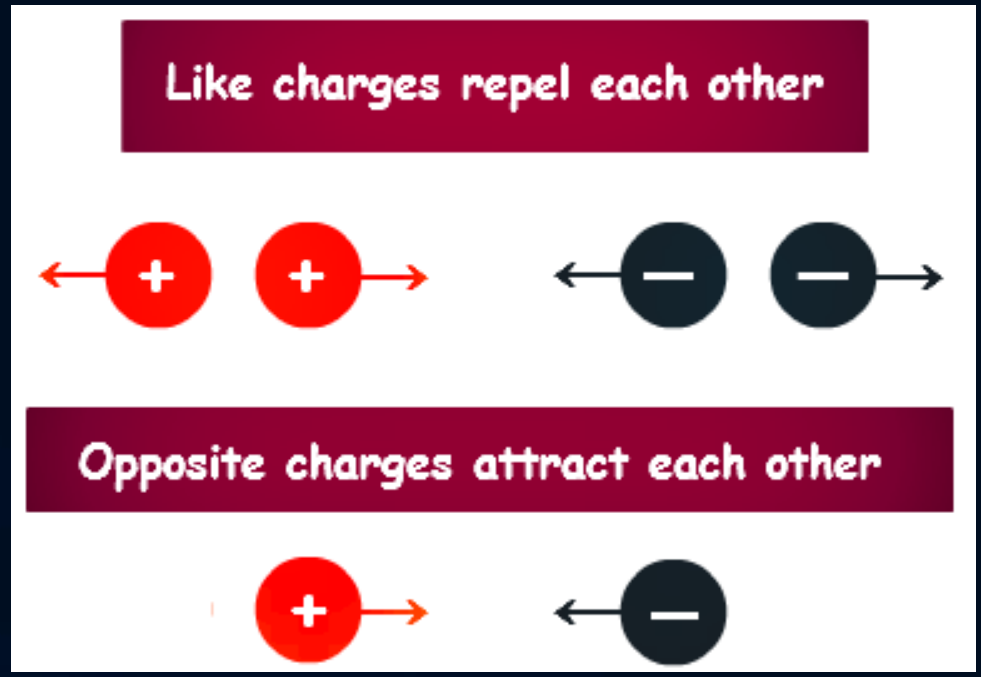
20.1 Electric Charge and Static Electricity

- When negatively and positively charged objects are brought together, electrons transfer until both objects have the same charge.



electric force

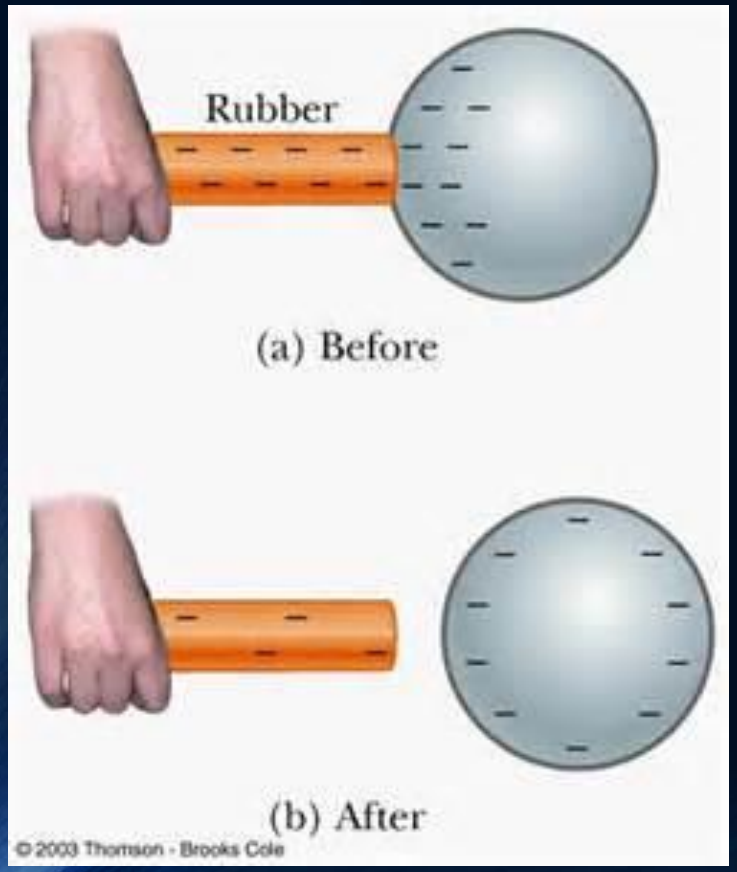
- The attraction or repulsion between electric charges.



static electricity

- A buildup of charges on an object.

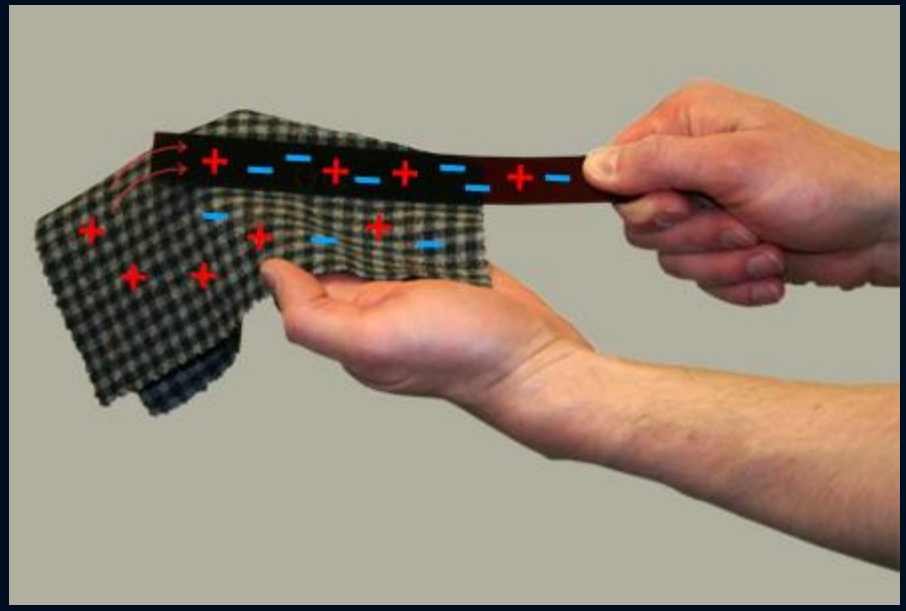
conservation of charge



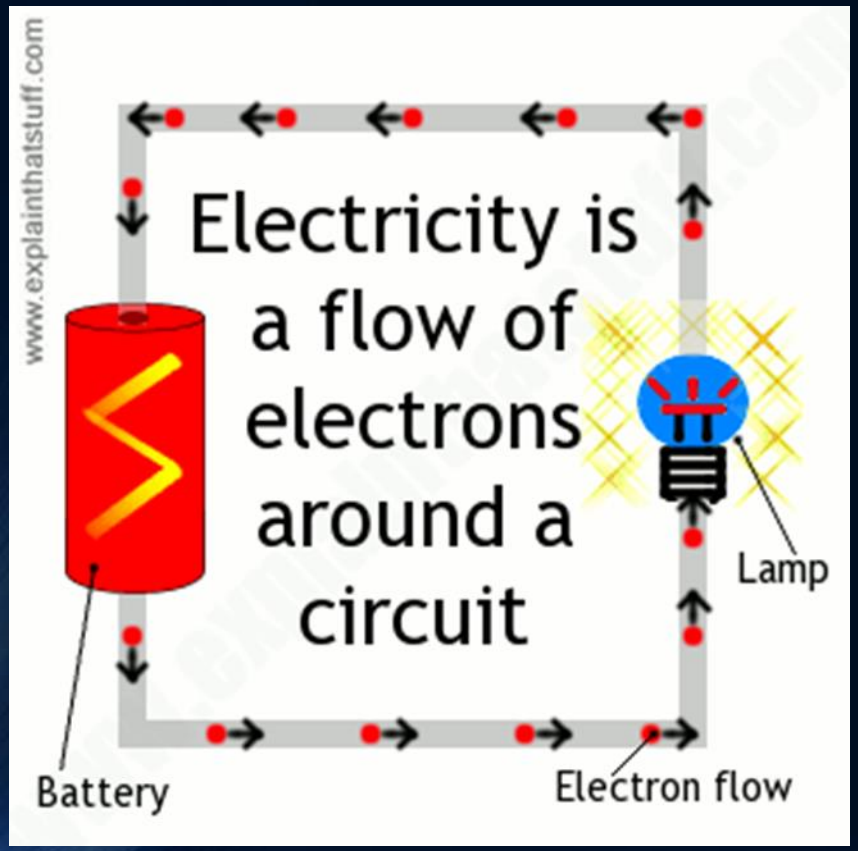
- The law that states that charges are neither created nor destroyed but only transferred from one material to another .

friction

- The force that one surface exerts on another when the two surfaces rub against each other.



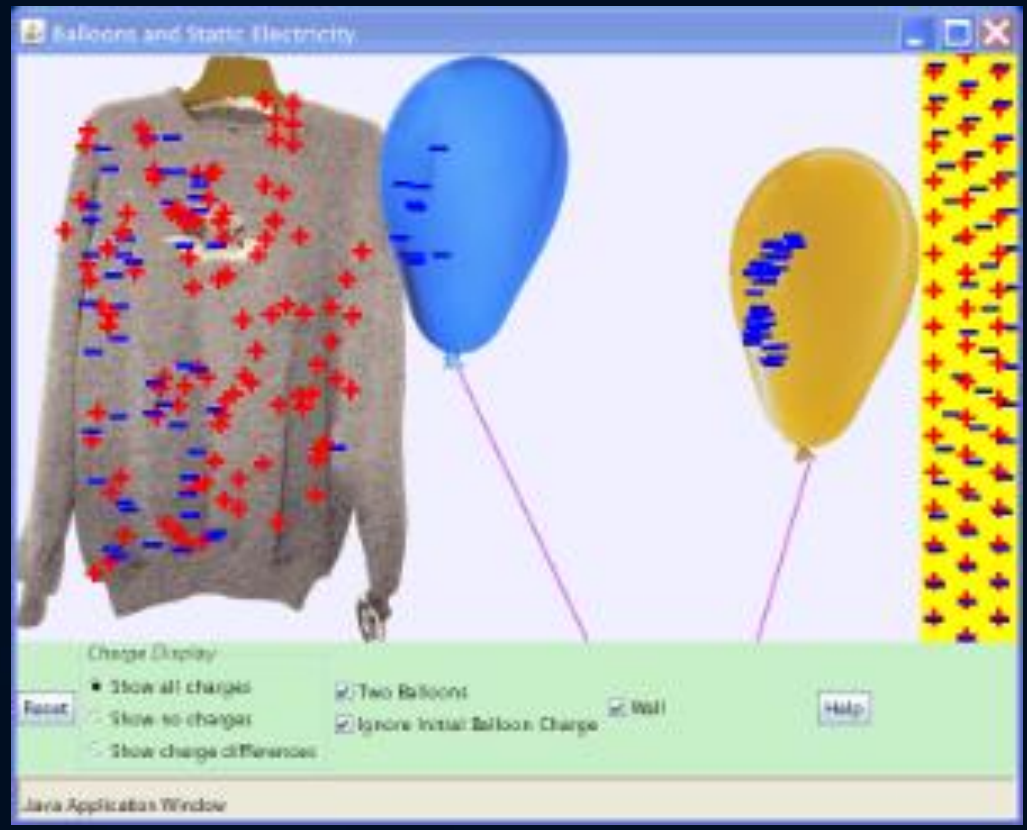
conduction



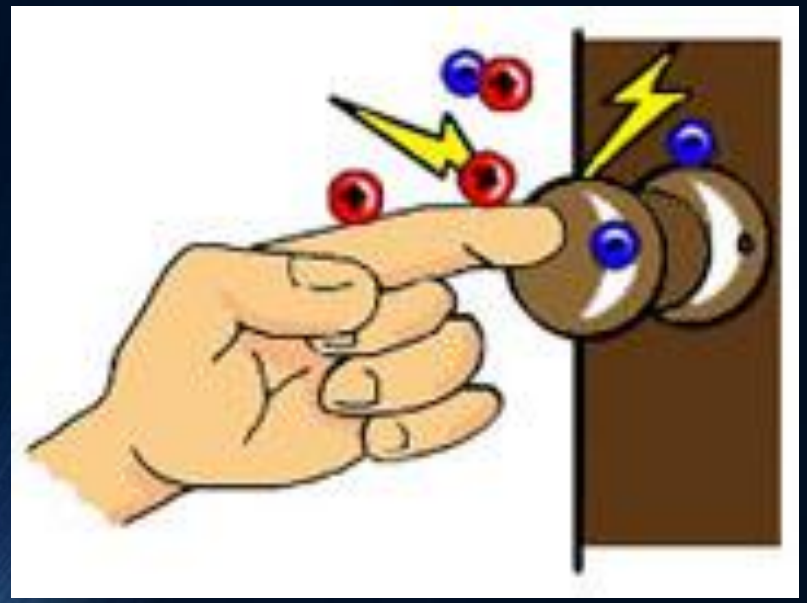
- A method of charging an object by allowing electrons to flow by direct contact from one object to another.

induction

- A method of charging an object by means of the electric field of another object.



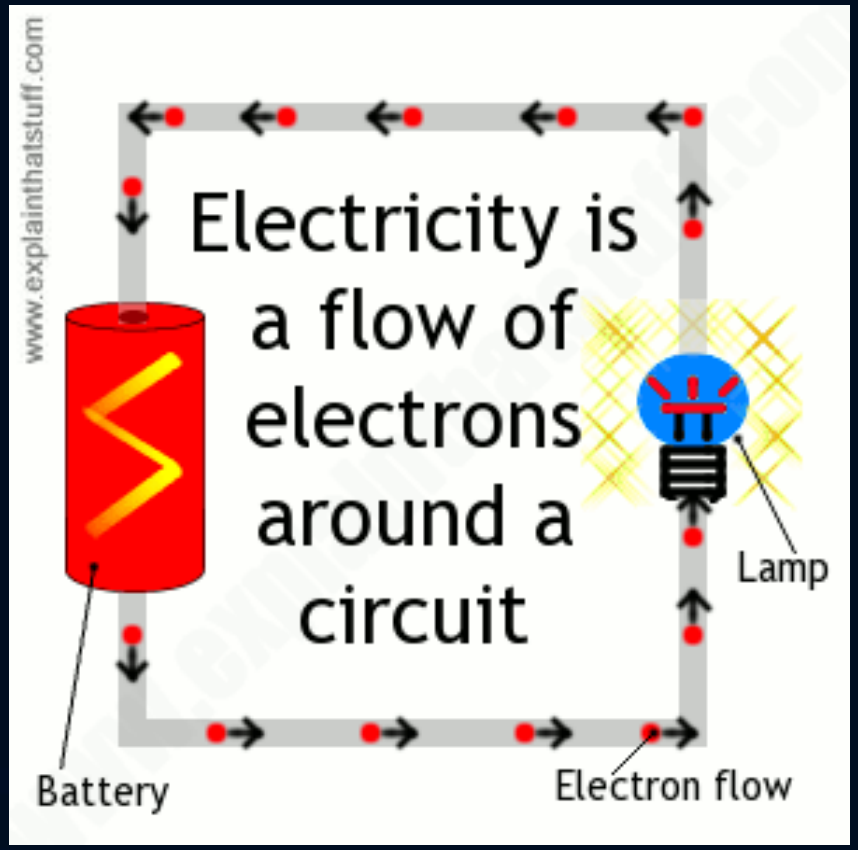
static discharge



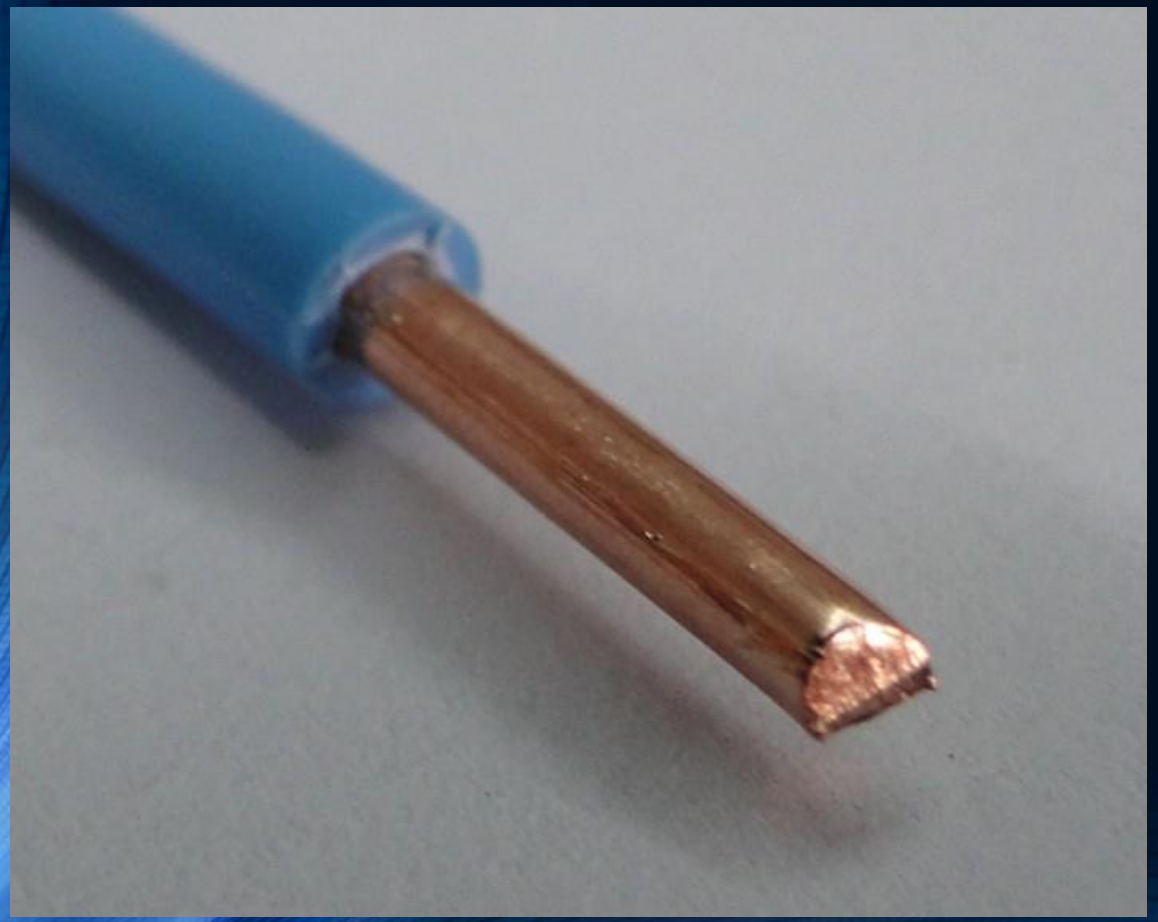
- The loss of static electricity as electric charges transfer from one object to another

20.2 Electric Current

- To produce electric current, charges must flow continuously from one place to another.



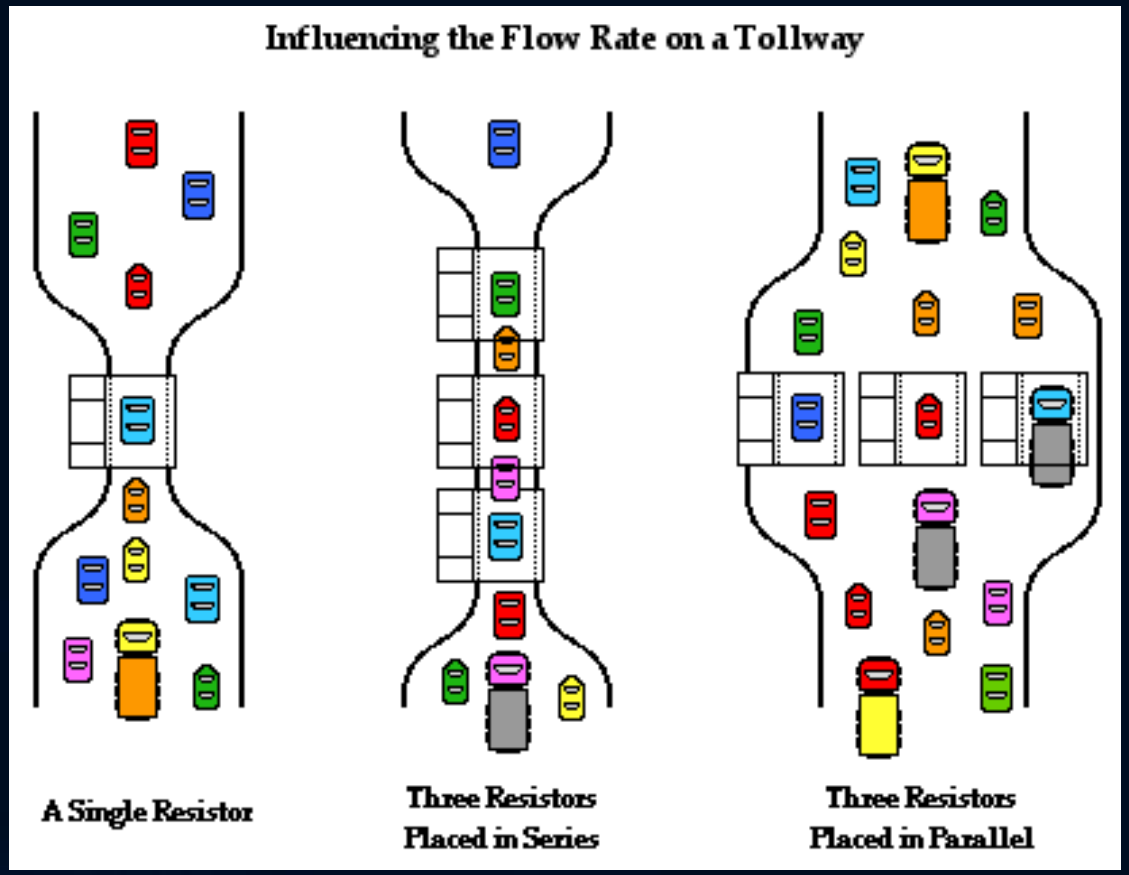
20.2 Electric Current



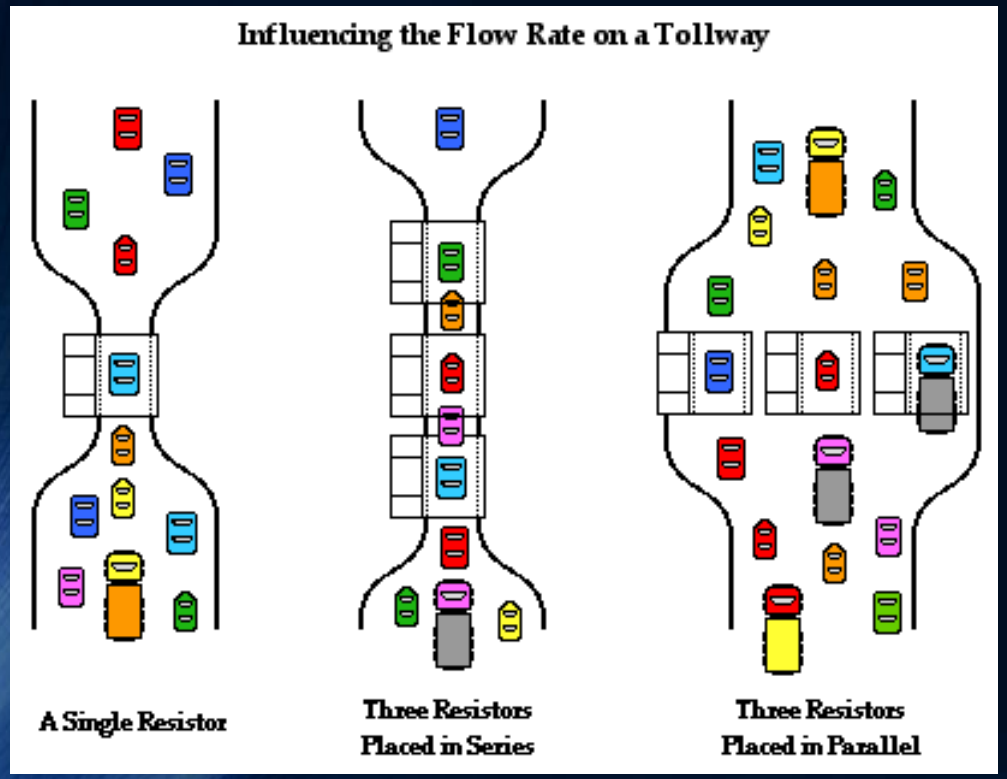
- A conductor transfers electric charge well. An insulator does not transfer electric charge well.

20.2 Electric Current

- Voltage causes a current in an electric circuit.



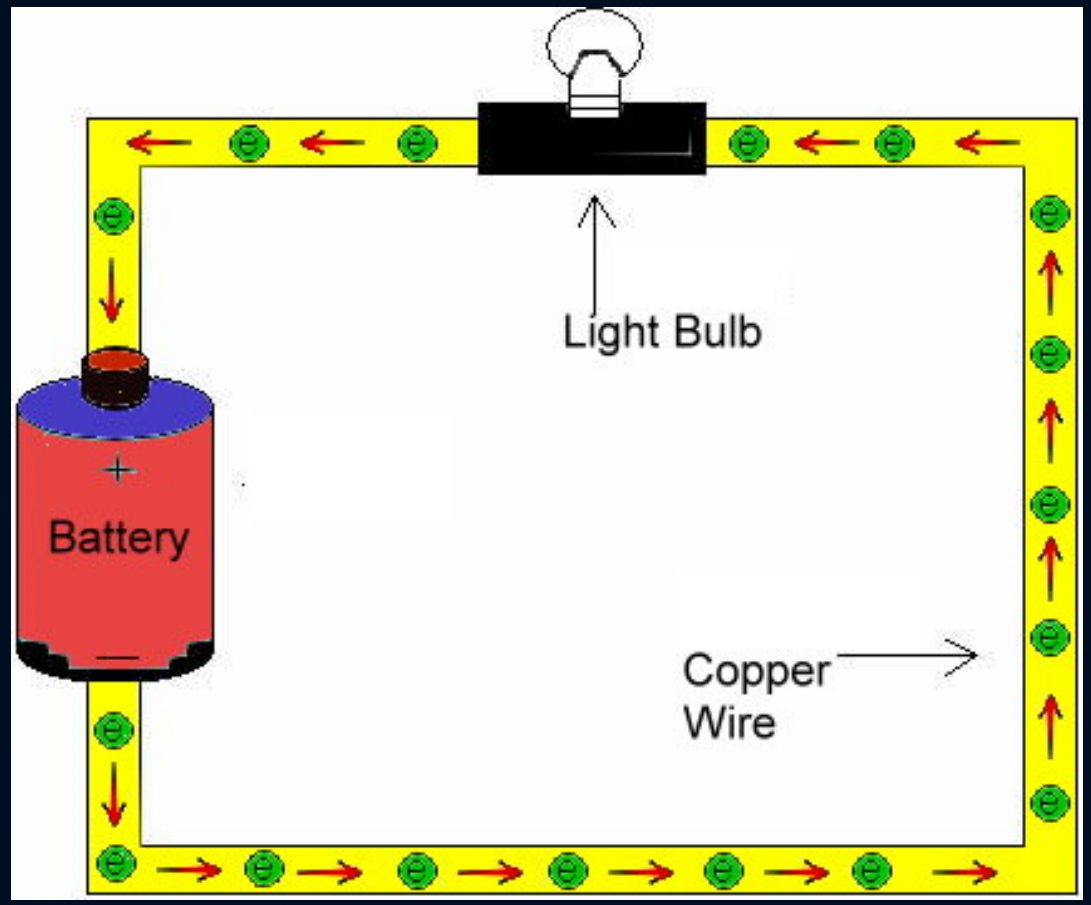
20.2 Electric Current



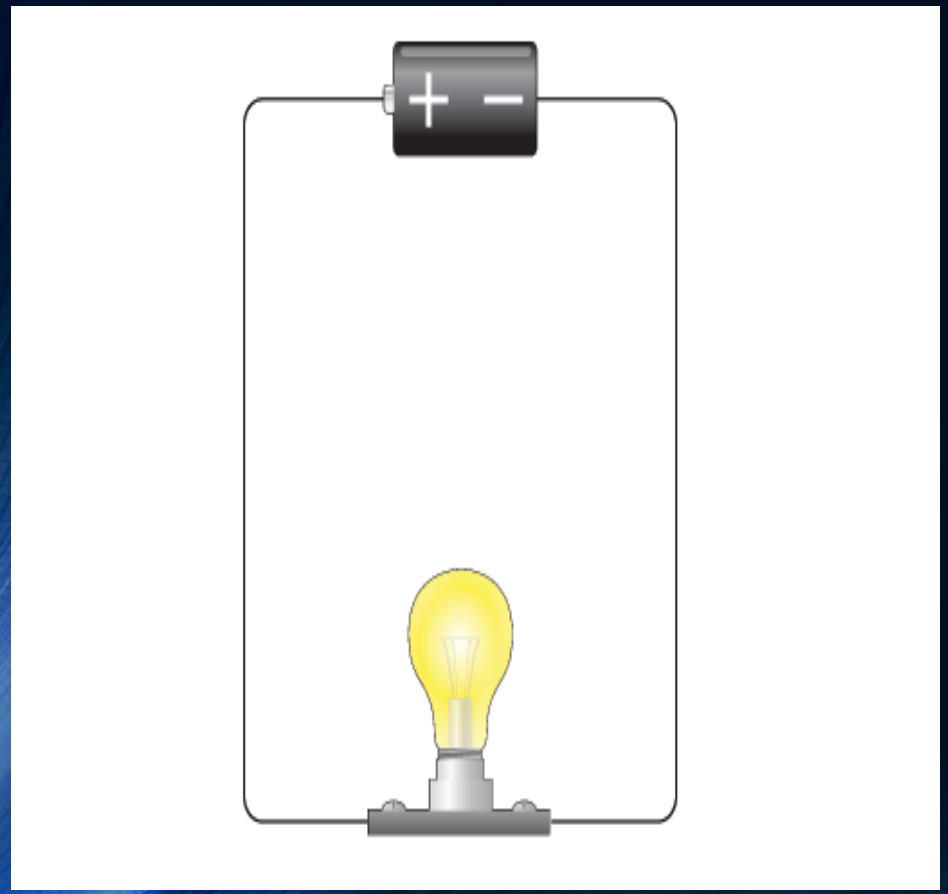
- The greater the resistance, the less current there is for a given voltage.

electric current

- The continuous flow of electric charges through a material.



electric circuit

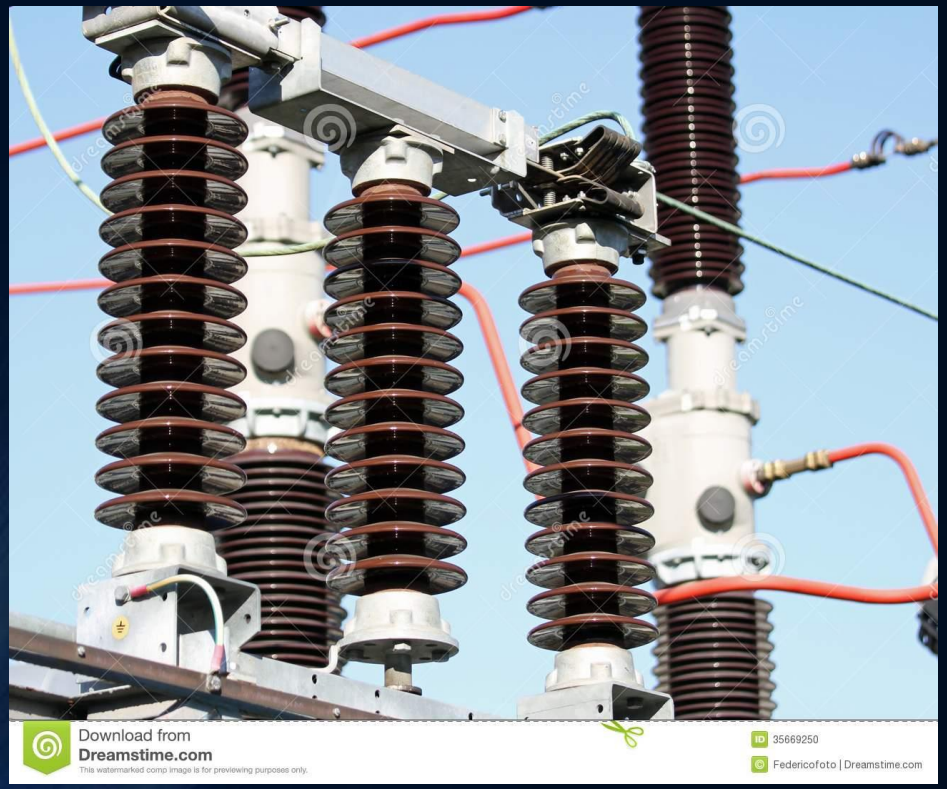


- A complete, unbroken path through which electric charges can flow.

conductor

- A material through which charges can easily flow.

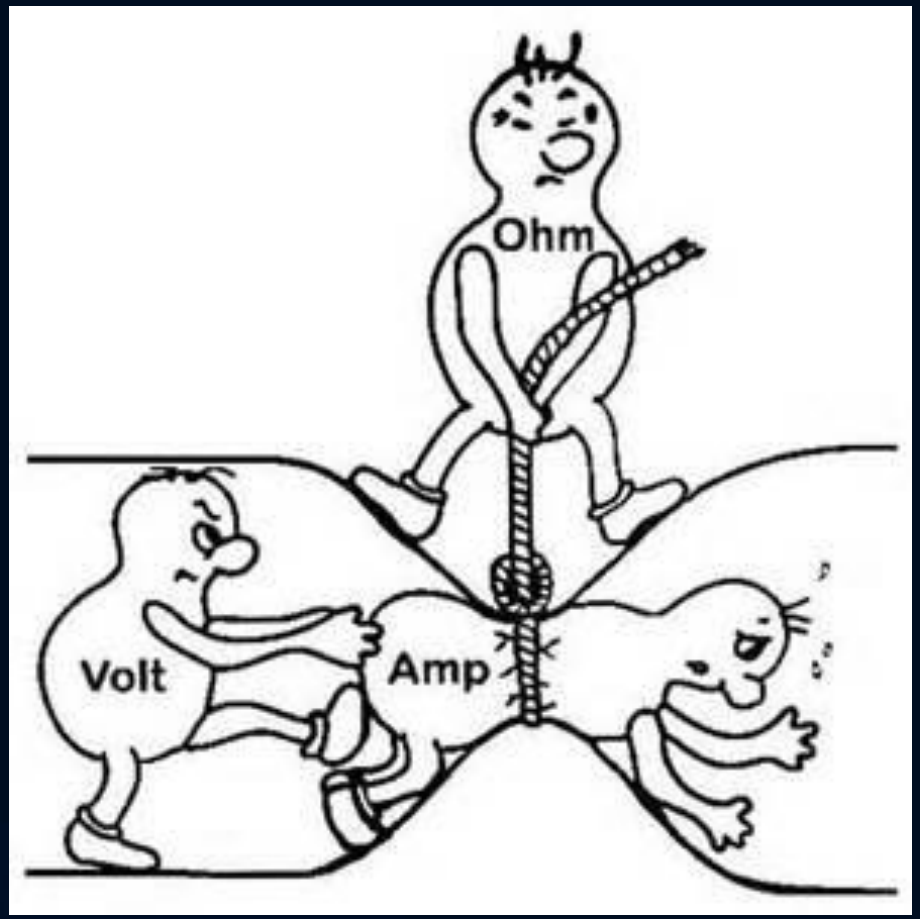
insulator



- A material through which charges cannot easily flow.

voltage

- The difference in electrical potential energy between two places in a circuit.

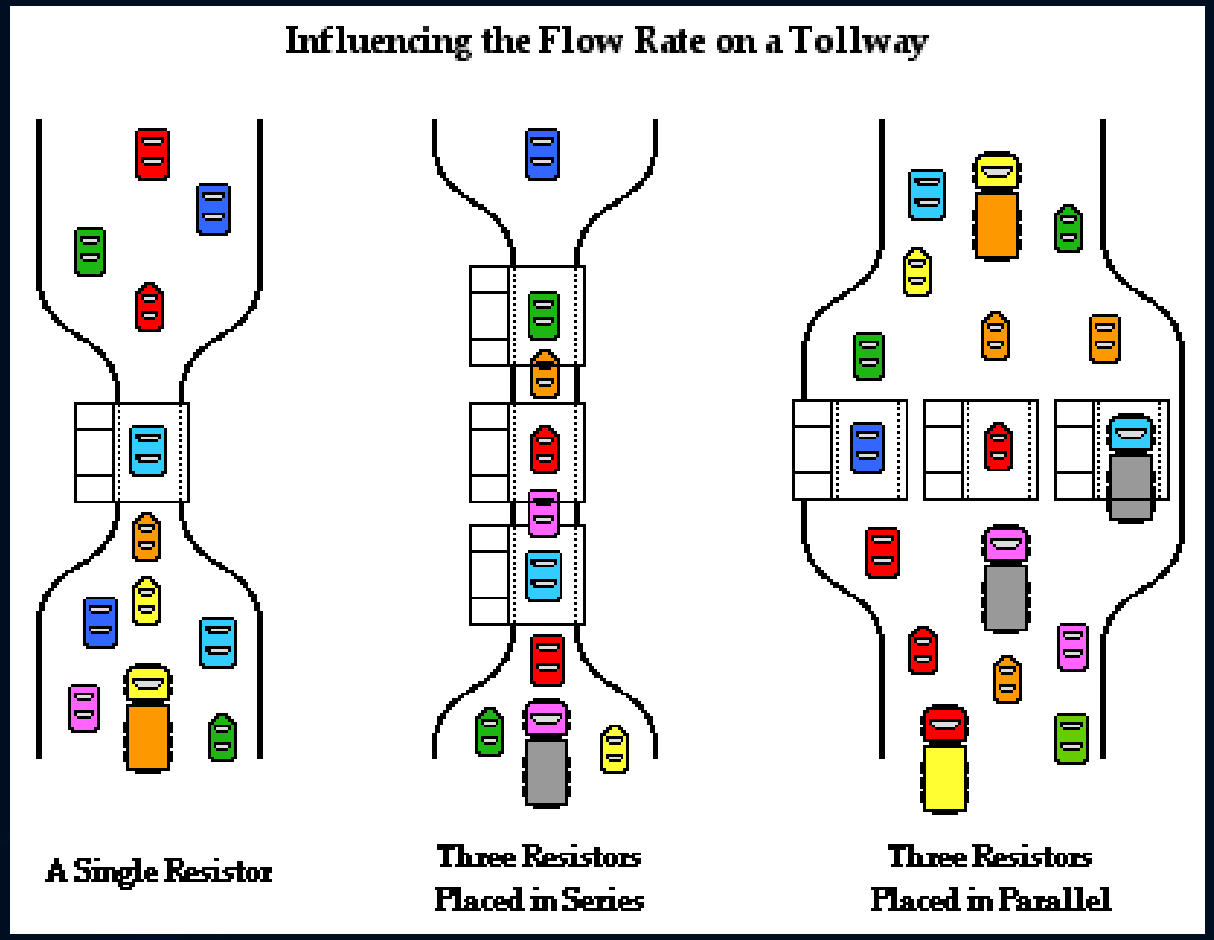


voltage source

- A device that creates an electrical potential energy difference in an electric circuit

resistance

- The measurement of how difficult it is for charges to flow through a material.



20.3 Batteries

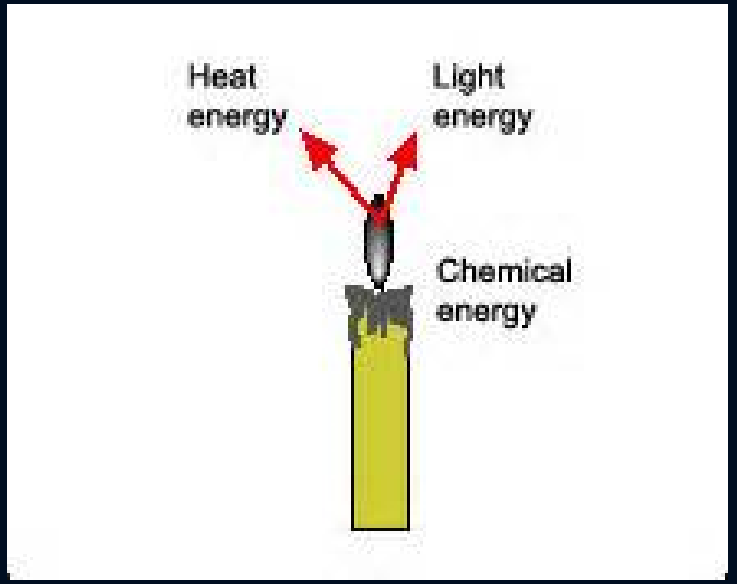
- Volta built the first battery by layering zinc, paper soaked in salt water, and silver.

20.3 Batteries

- Chemical reactions in an electrochemical cell cause one electrode to become negatively charged and the other electrode to become positively charged.

chemical energy

- A form of potential energy that is stored in chemical bonds between atoms.

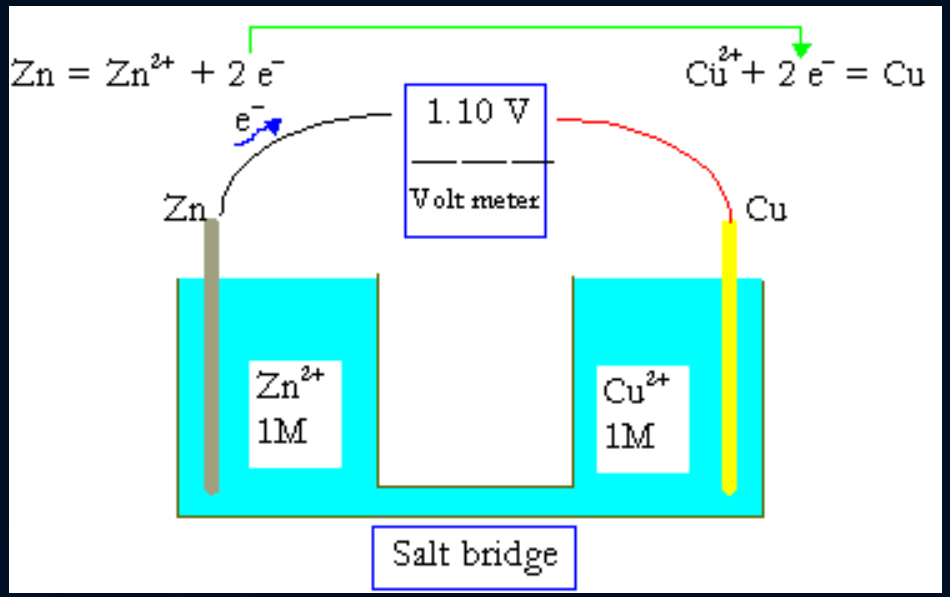


chemical reaction

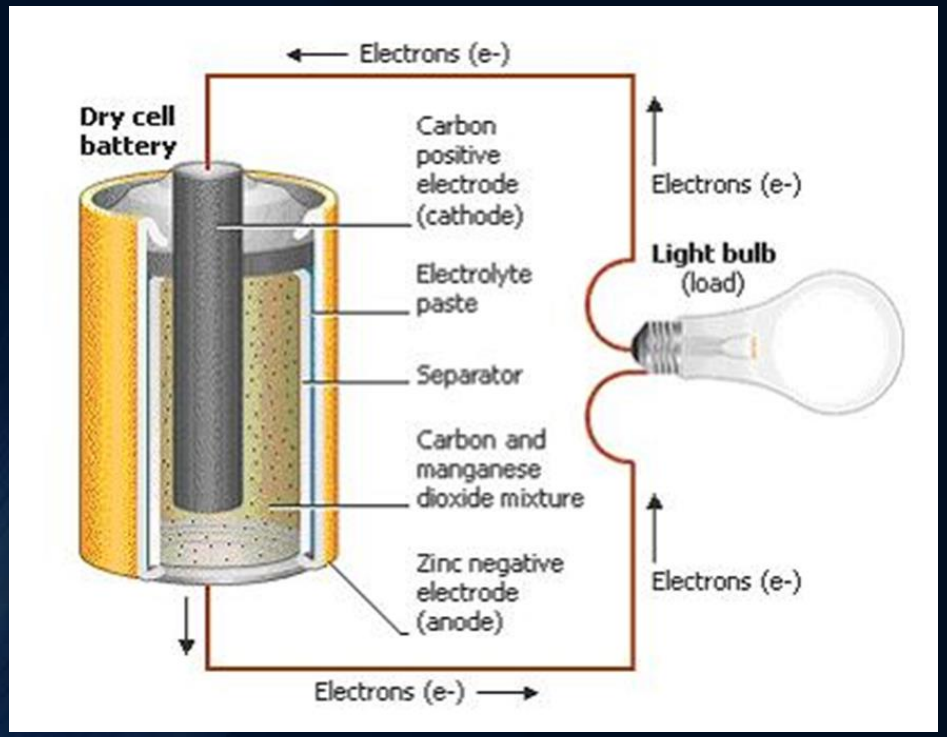
- The process in which substances undergo chemical changes that result in the formation of new substances.

electrochemical cell

- A device that transforms chemical energy into electrical energy



electrode



- a metal part of an electrochemical cell which gains or loses electrons.

electrolyte

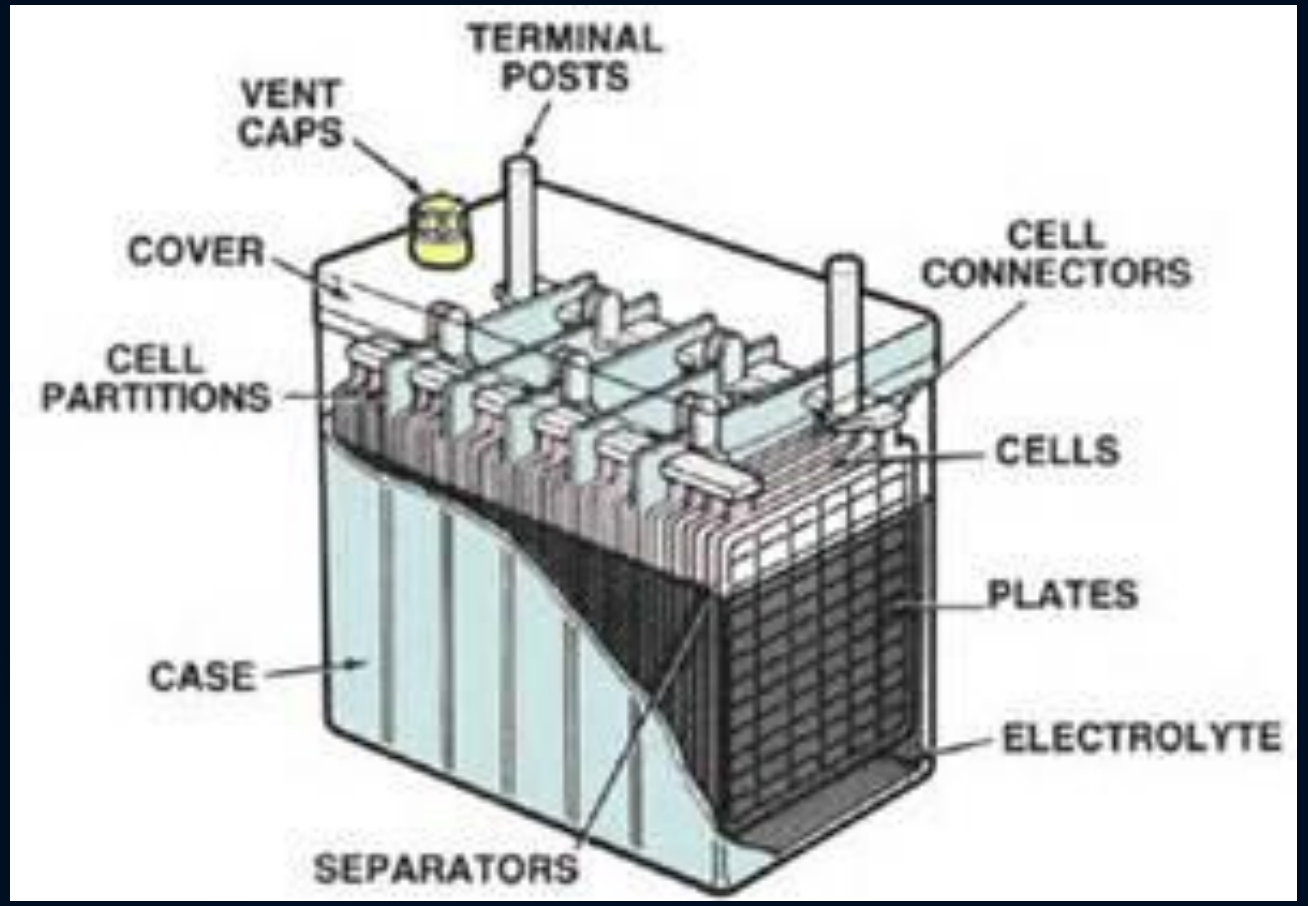
- A liquid or paste that conducts electric current.

terminal

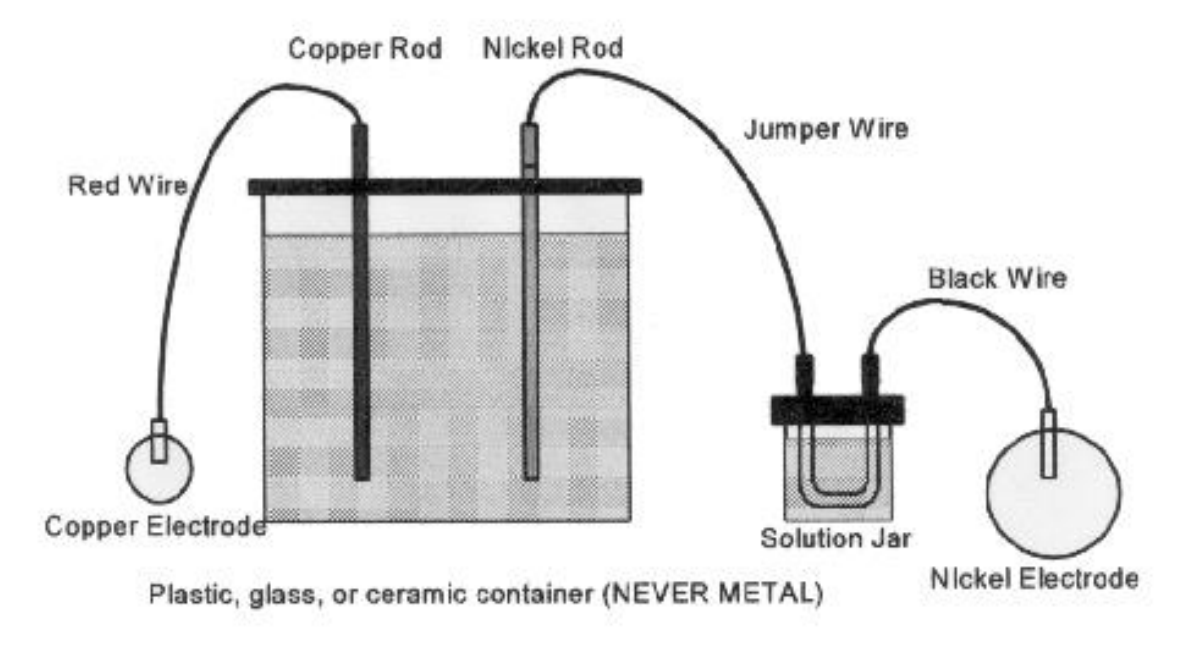
- A convenient attachment point used to connect a cell or battery to a circuit.

battery

- A combination of two or more electrochemical cells in series.



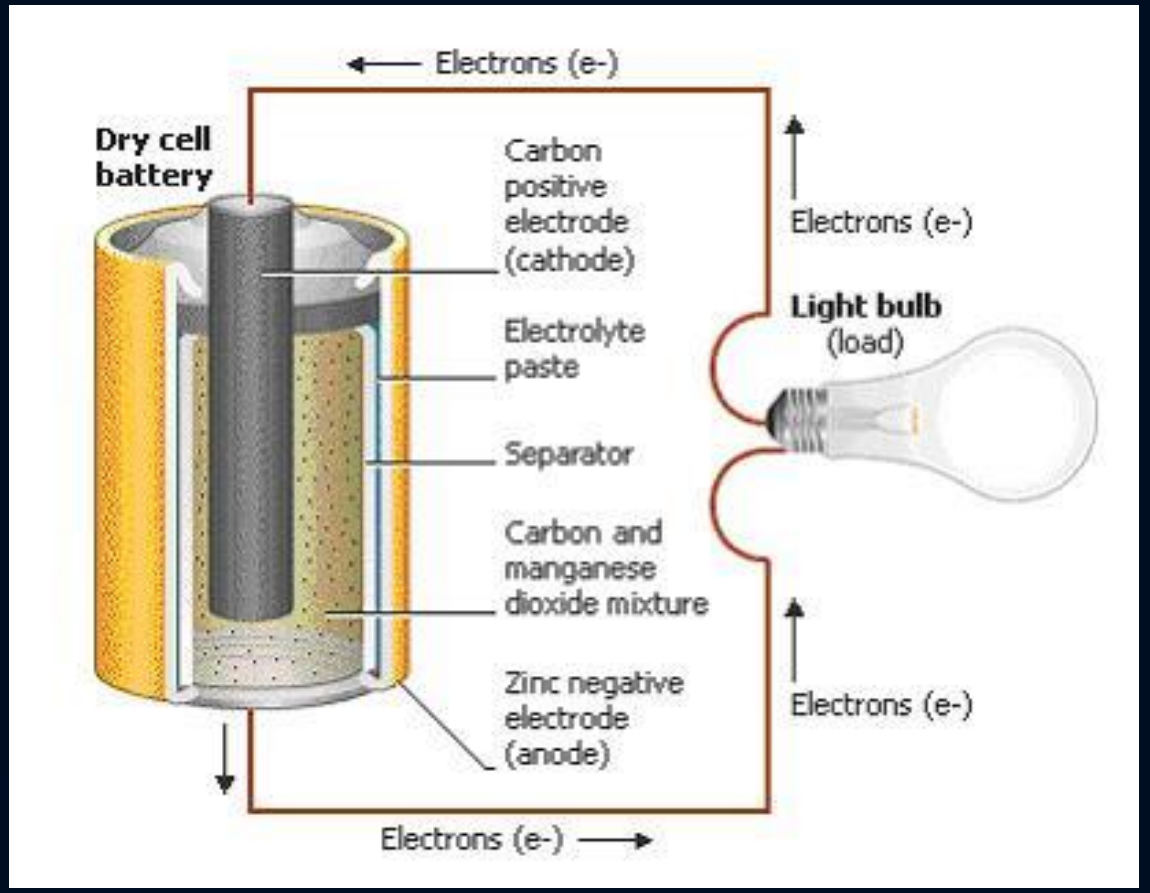
wet cell



- An electrochemical cell in which the electrolyte is a liquid.

dry cell

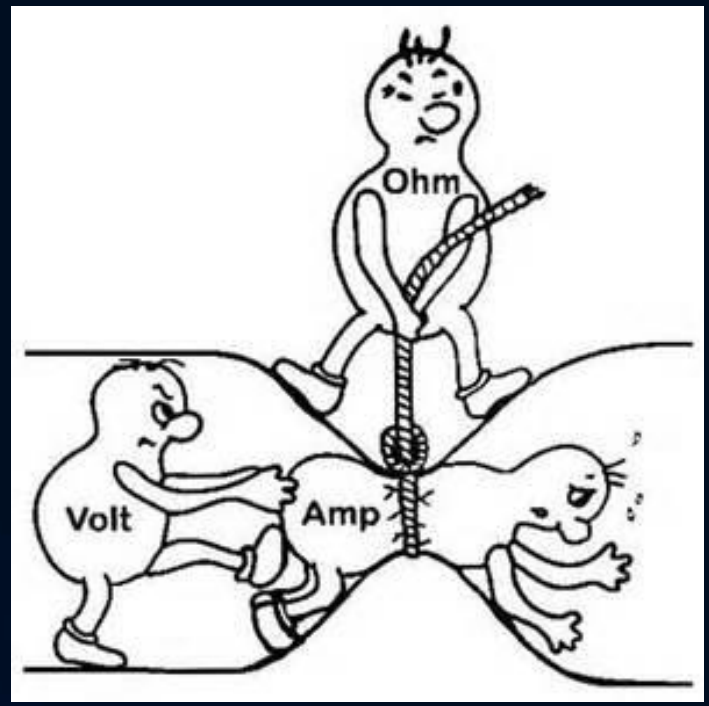
- An electrochemical cell in which the electrolyte is a paste.



20.4 Electric Circuits and Power

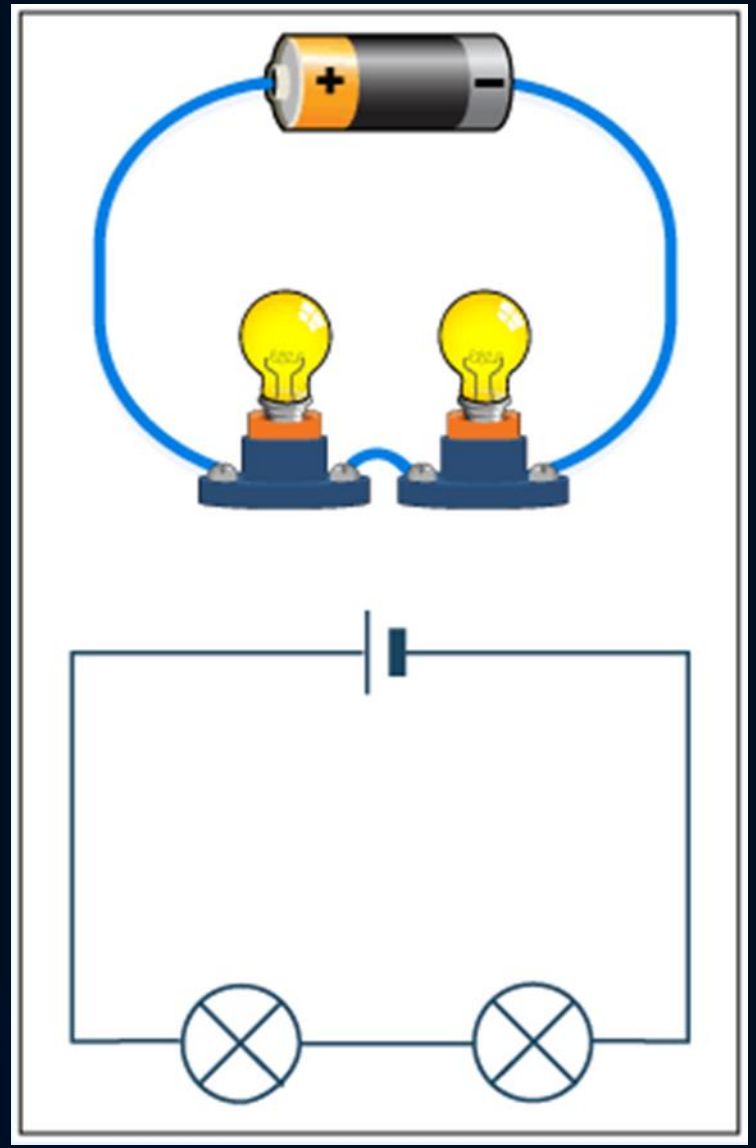
- Ohm's law says that the resistance is equal to the voltage divided by the current.

Resistance = Voltage ÷ Current



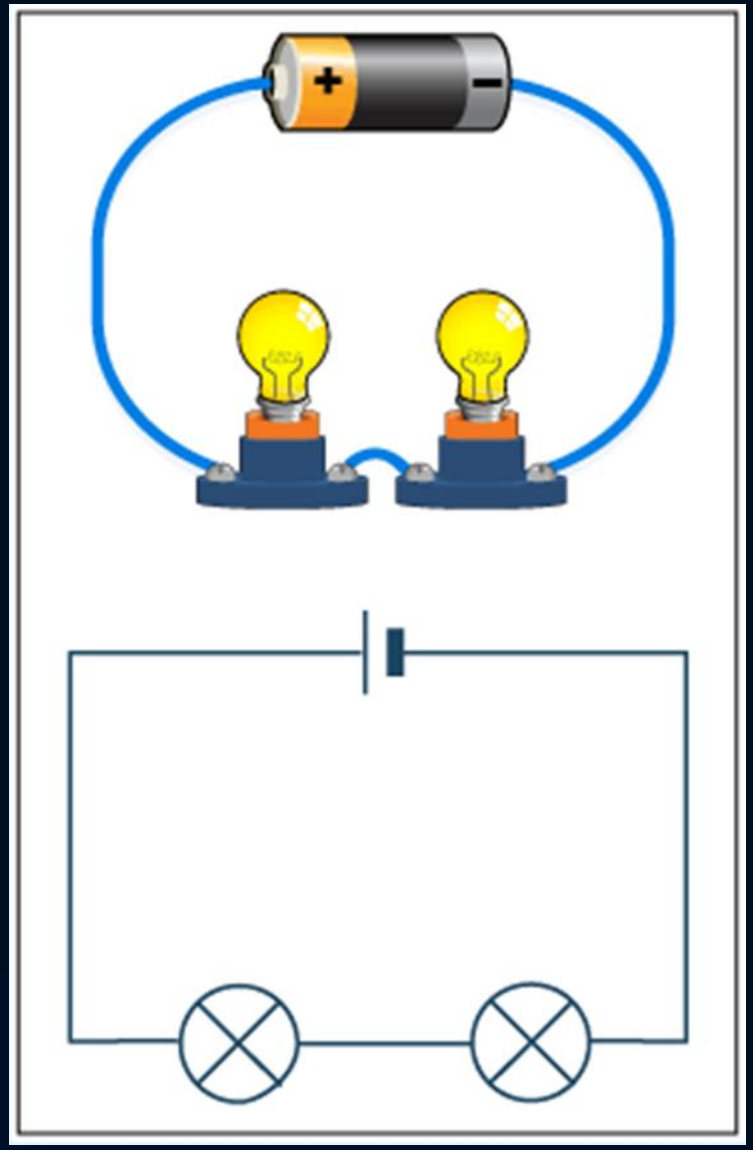
20.4 Electric Circuits and Power

- Circuits have a source of electrical energy and devices that are run by electrical energy. Circuits are connected by conducting wires.

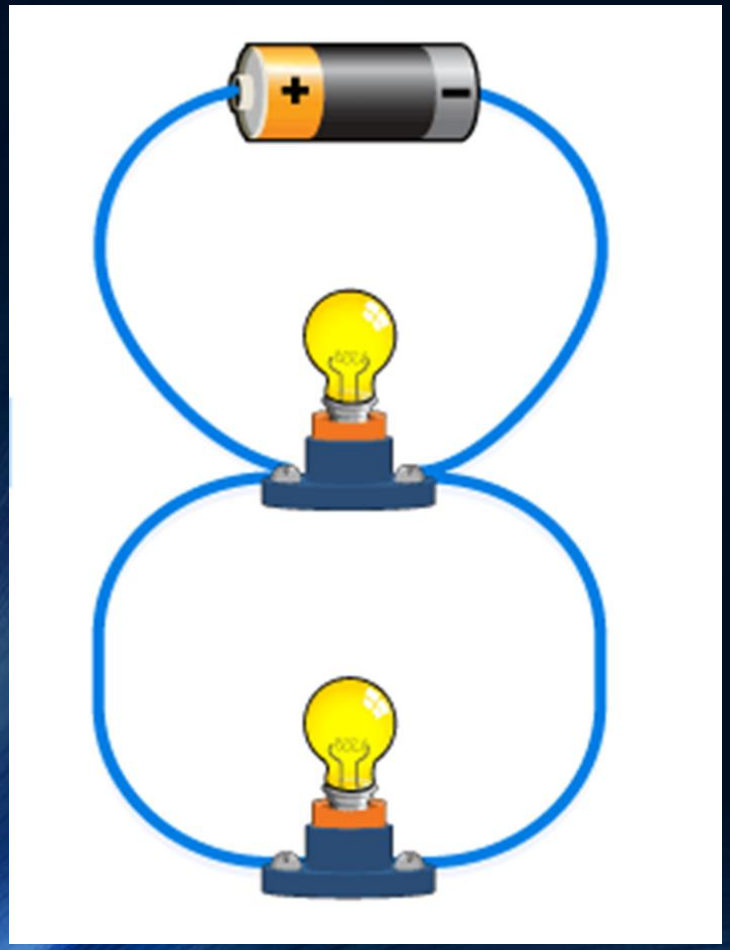


20.4 Electric Circuits and Power

- In a series circuit, there is only one path for the current to take..



20.4 Electric Circuits and Power



- In a parallel circuit, there are several paths for the current to take.

20.4 Electric Circuits and Power

- You can calculate power by multiplying voltage by current.

$$\text{Power} = \text{Voltage} \times \text{Current}$$

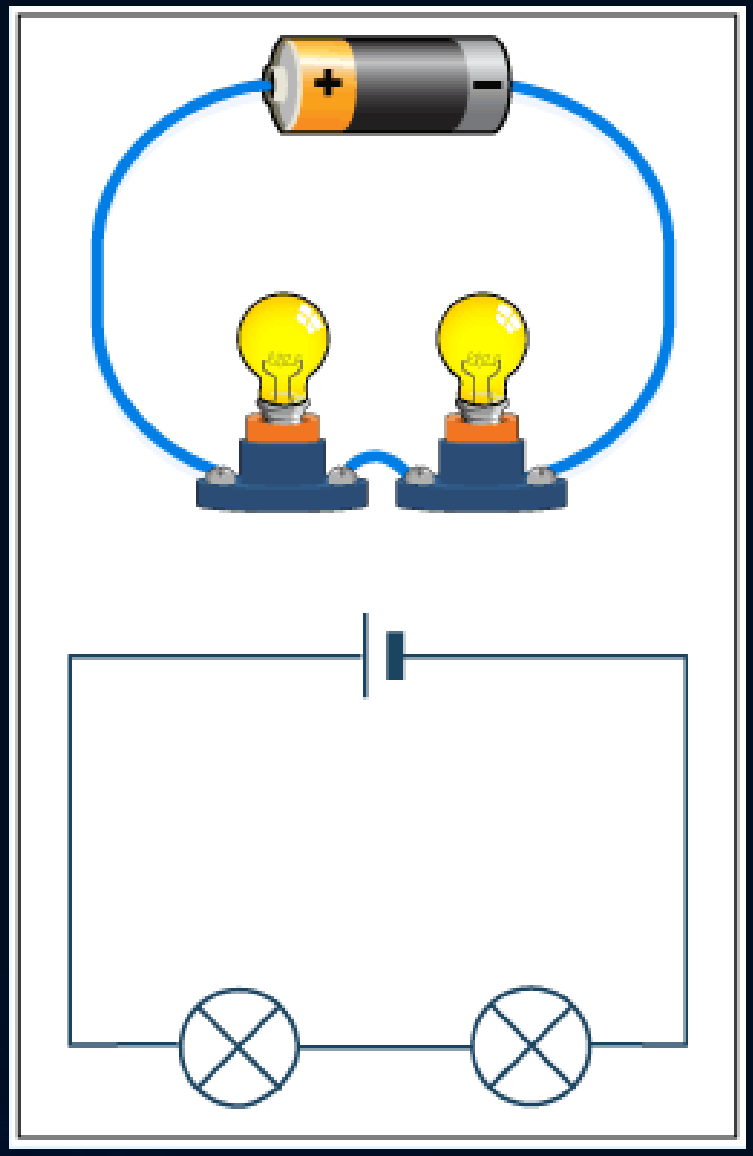
20.4 Electric Circuits and Power

- The total amount of energy used by an appliance is equal to its power multiplied by the amount of time it is used.

$$\text{Energy} = \text{Power} \times \text{Time}$$

series circuit

- An electric circuit with a single path.

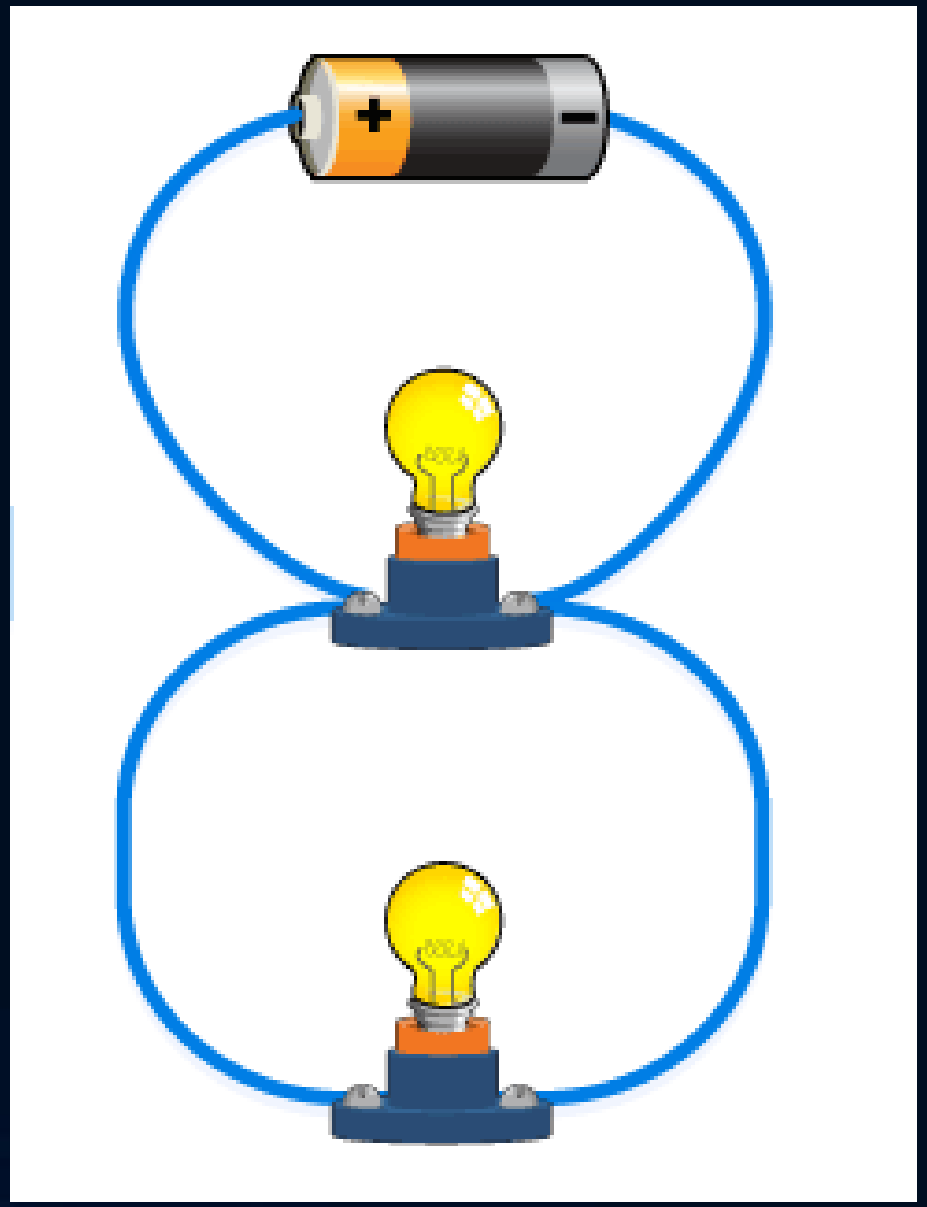


ammeter

- A device used to measure current in a circuit.

parallel circuit

- An electric circuit with multiple paths.



voltmeter

- A device used to measure voltage, or electrical potential energy difference.

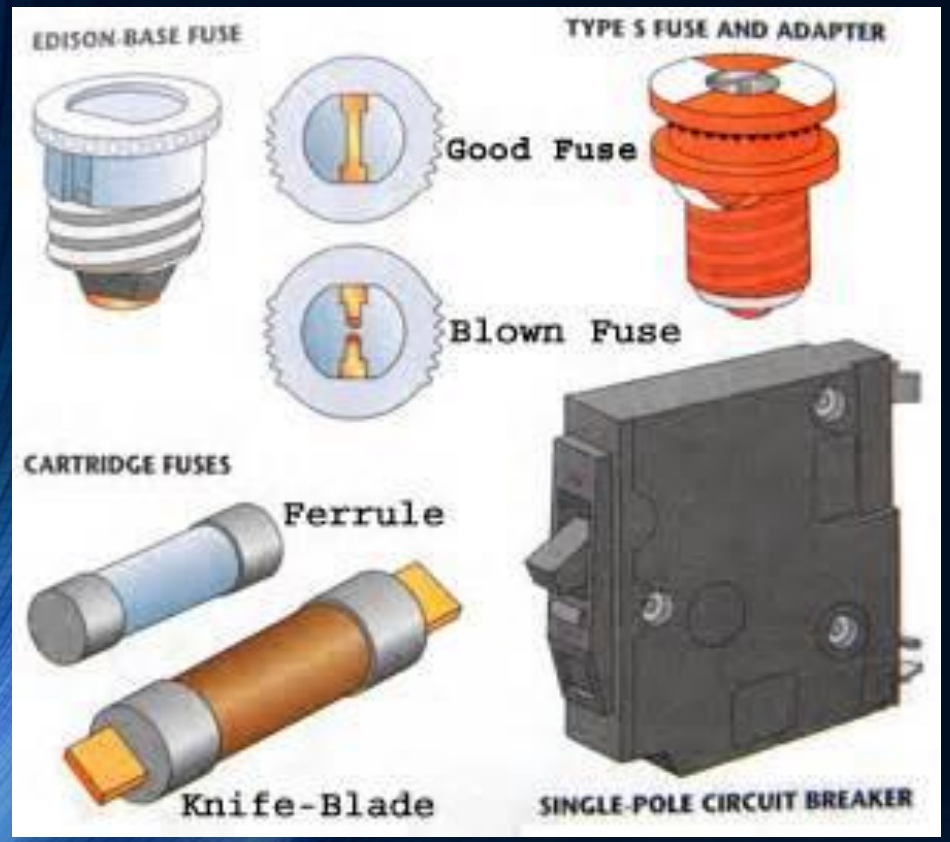
power

- The rate at which one form of energy is transformed into another.

20.5 Electrical Safety

- One way to protect people from electric shock and other electrical danger is to provide an alternate path for electric current.

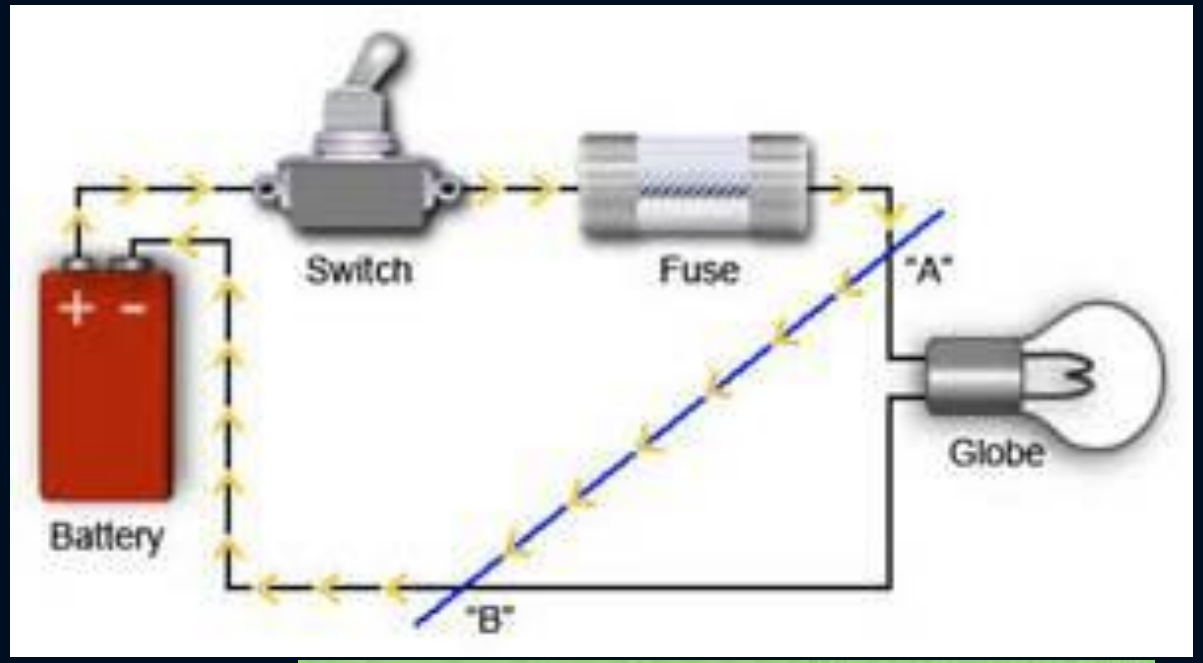
20.5 Electrical Safety

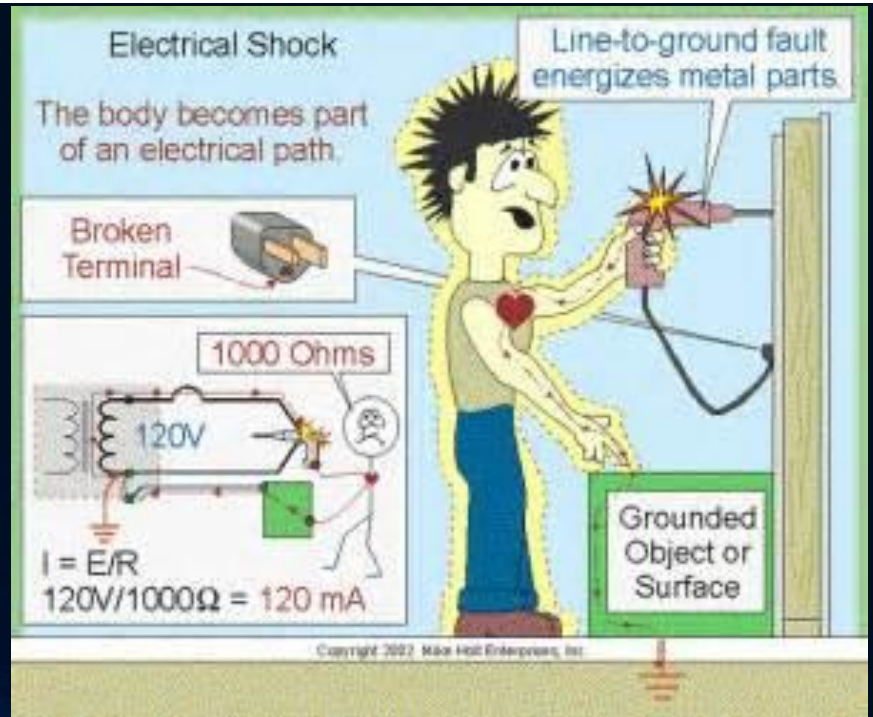


- In order to prevent circuits from overheating, devices called fuses and circuit breakers are added to circuits.

short circuit

- A connection that allows current to take an unintended path.





grounded

- Allowing charges to flow directly from the circuit into Earth in the event of a short circuit.

third prong

- The round prong of a plug that connects any metal pieces in an appliance to the safety grounding wire of a building

fuse

- A safety device with a thin metal strip that will melt if too much current passes through a circuit.

circuit breaker

- A reusable safety switch that breaks the circuit when the current becomes too high.