Unlike charges give negative potential energy (attractive force). Unlike charges attract one another	Charging an object by allowing it to come into contact with an object that already has an electrical charge	Two objects rub together and one becomes positively charged and the other becomes negatively charged	Charging an object without direct contact (proximity to nearby object charges neutral object)
Attraction of Electric Charges	**Charging by Conduction**	**Charging by Friction**	**Charging by Induction**
Materials that allow electric charges to flow through them easily	Unit used to measure quantity of electric charge	A flow of electricity through a conductor	The continuous flow of electrons through a conductor
Conductors	**Coulomb**	**Current**	**Current Electricity**
An electrical current that always moves in one direction	Consists of a voltage source and a continuous conducting path for a current to follow	The flow of electric charge electric field force field produced by an electrical charge	The field around charged particles that exerts a force on other charged particles.
Direct current	**Electric circuit**	**Electric current**	**Electric Field**
A map of an electric field representing the direction of the force that a positive charge would experience	The product of a surface area and the component of the electric field perpendicular to the surface	A Mechanical device that uses wire loops rotating in a magnetic field to generate electricity	The difference in electrical charge between two points in a circuit expressed in volts (aka potential difference)
Electric field lines	**Electric Flux**	**Electric generator**	**Electric Potential**

Potential energy due to the position of a charge near other charges	Materials that have electrons that are free to move throughout the material; for example, metals	A form of energy from electromagnetic interactions	A fundamental force that results from the interaction of electrical charge
Electric potential energy	**Electrical conductors**	**Electrical energy**	**Electrical force**
Electrical nonconductors, or materials that obstruct the flow of electric current	The property of opposing or reducing electric current	Water solution of ionic substances that conducts an electric current	A magnet formed by a solenoid that can be turned on and off by turning the current on and off
Electrical insulators	**Electrical resistance**	**Electrolyte**	**Electromagnet**
One of four fundamental forces; the force of attraction or repulsion between two charged particles	Process in which current is induced by moving a loop of wire in a magnetic field or by changing the magnetic field	Opposite to conventional current; electron current flows from the negative terminal to the positive terminal	An accumulated electric charge on an object from a surplus or deficiency of electrons; also called
Electromagnetic force	**Electromagnetic induction**	**Electron current**	**Electrostatic charge**
Magnet with two poles (North & South); all magnets are dipoles; cutting one in half creates two dipoles	Invisible lines that map out the magnetic field around a magnet	The lines of force surrounding a permanent magnet or a moving charged particle	Forces that may attract or repel without touching.
Magnetic Dipole	**Magnetic Field Lines**	**Magnetic Flux**	**Magnetic Forces**

Iron, cobalt, nickel	The ends, or sides, of a magnet about which the force of magnetic attraction seems to be concentrated	The flipping of polarity of the earth's magnetic field	The force of repulsion (pushing) or attraction (pulling) between poles of magnets
Ferromagnetic Materials	**Magnetic poles**	**Magnetic reversal**	**Magnetism**
One of the two types of electric charge; repels other negative charges and attracts positive charges	Unit of resistance equivalent to volts/amps	The law that states that resistance is equal to voltage divided by current (R=V/I)	One of the two types of electric charge; repels other positive charges and attracts negative charges
Negative electric charge	**Ohm**	**Ohm's Law**	**Positive electric charge**
The rate of doing work is called power	$P = IV = I^2R = V^2/R$	Like charges give positive potential energy (repulsive force). Like charges repel one another.	A material's opposition to the flow of electric current, measured in ohms
Power	**Power Dissipated by a Resistor**	**Repulsion of Electric Charges**	**Resistance**
Objects that allow charge to flow at a reduced rate (change into heat or light)	Electrical connection of components in such a manner that current flows first through one and then through the other	A circuit that has only one pathway for electricity to flow through	A cylindrical coil of wire that becomes electromagnetic when a current runs through it
Resistors	**Series**	**Simple Circuits**	**Solenoid**

Some materials in which, under certain conditions, the electrical resistance approaches zero	The electric potential difference across a resistor or other part of a circuit that consumes power		
Superconductors	**Voltage drop**		