Physical Glossary

A

* **absolute zero:** the lowest temperature there can be... equal to -273 degrees C or -460 degree F
* **absorption spectrum-** electromagnetic radiation that has passed through a medium in which radiation of certain frequencies is absorbed
* **acceleration -** the change in velocity divided by time (a = Δv / Δt) (the rate of change of velocity)
* **acceleration due to gravity**-the acceleration of an object in free fall, 9.8 m/sec 2 on Earth
* **accuracy** - describes how close the measurement is to the true value
* **acid** - a substance that produces hydronium ions when dissolved in water - acids have pH less than 7
* **acid rain** – rain with a ph less than5.6
* **acid/base reaction-** a chemical reaction where an acid and base are the reactants and a salt and water are the products, often called neutralization
* **acoustics -** the study of sound
* **actinide** - Any of the 14 radioactive elements having atomic numbers 90 to 103; used in nuclear power generation and nuclear weapons.
* **activation energy** - Amount of energy needed to start a reaction
* activation energy-energy needed to break chemical bonds in the reactants to start a reaction
* **active solar heating**- collecting the sun’s energy with solar panels heating and circulating it with fans or pumps
* addition reaction-two or more substances chemically combine to form a new compound
* **aerosol** - a solid or liquid in a gas
* **air resistance** - Friction acting on an object moving through the air (Lesson 16)
* air resistance - frictional force air exerts on a moving object
* **alcohol**- type of compound formed when –OH groups replace one or more hydrogen atoms in a hydrocarbon.
* alkali metals-elements in the first group of the periodic table
* **allotropes-** different structural forms of the same element
* **alloy-** a mixture consisting of a metal and one or more elements, a solution of two or more solvents
* **alpha particle-** a particle of nuclear radiation emitted from a decaying atomic nucleus; has a charge of 2+, an atomic mass of 4, and is the largest, slowest, and least penetrating form of radiation
* **alpha radiation-** a form of radiation that consists of a helium nuclei that can be emitted from the nuclei of an atom and can be stopped by a thin sheet of paper
* Alternating current – electric current that reverses its direction in a regular pattern
* **amalgam- an** alloy containing the element mercury
* amino acids - organic molecules that are the building blocks of proteins
* **ammeter-** a device that measures electrical current passing through in amperes; connected in series with the circuit
* amorphous - solids that do not have a repeating pattern of molecules or atoms
* **ampere**- the unit for measuring current, the rate of flow of electrons in a circuit
* **Amplification** – the process of increasing the strength of an electric signal
* **Amplitude** – in a wave the distance from the rest position of the medium to either the crest of trough
* **amplitude modulation –** Am waves; radio waves whose amplitude is varied with voice, music, , video, or data for transmission over long distance
* **analysis** - the process of evaluating data - may include thinking, creating graphs, doing calcs, and discussing ideas with others
* **angle of incidence-** in waves, the angle formed by the incident wave and the normal
* **angle of reflection-** in waves, the angle formed by the reflected wave and the normal
* **anhydrous-** a chemical compound that normally has water molecules attached to its ions but from which the water has been removed
* **anion -** a negatively charged ion; symbol placed in the second position when writing the formula of a chemical compound
* **antacid-** a chemical that changes an acid to a neutral substance
* **antifreeze-** a solute added to a solvent to lower the temperature at which the solvent will freeze
* **aqueous –** describes a solution wade with water
* **Archimedes Principle** - states the buoyant force is equal to the weight of the fluid displaced by an object
* **aromatic compound –** chemical compounds that contain the benzene ring structure
* **artificial satellite-** human made device that orbits Earth
* **Asteroid** - an object that orbits the sun but too small to be considered a planet
* **astronomical unit or AU** - the distance between Earth and Sun, 1 AU
* **atom** - the smallest particle of matter that retains the identity of its element
* **atomic mass** - the average mass of all the known isotopes of an element, expressed in AMU
* **atomic mass unit or AMU** - a unit of mass equal to 1.66 x 10-24 grams, which is 1/12 the mass of isotope Carbon 12
* **atomic nucleus-** comprised of all the protons and neutrons in the center of an atom, occupying a tiny amount of the space and containing the majority of the mass within an atom
* **atomic number-** number of protons in an atom
* average - a mathematical process in which you add all the values and divide by the number of values
* **average speed-** a rate of motion determined by dividing the total distance traveled by the total travel time.

**B**

* **balance-** a device used in laboratories to measure mass; it works by balancing a mass to be determined with a standard mass that is known
* **balanced equation-** a chemical equation that has the same number of atoms of each element on both sides of the equation
* **balanced forces-** forces that are equal in size and opposite in direction
* **Bar Graph –** a type of graph used to show information collected by counting; uses vertical or horizontal bars of different lengths to help people compare quantities.
* **base** - a substance that produces hydroxide ions when dissolved in water - bases have a pH greater than 7
* **base/acid reaction-** a chemical reaction where an acid and base are the reactants and a salt and water are the products, often called neutralization
* **Bernoulli’s principle-** the velocity of a fluid increases, the pressure exerted by the fluid decreases.
* **beta radiation-** a form of radiation that consists of an electron or positron that may be emitted from the nuclei and can be stopped by aluminum foil
* **bias-** a mind-set that leads the researcher to base their hypotheses or conclusions on a narrow range of variables discounting other plausible ones
* **Big Bang** - theory that the universe began as a huge explosion 10 billion to 20 billion years ago
* **binary compound-** a chemical compound composed of two elements
* binary star - a system of two stars orbiting each other that are gravitationally tied together
* **binding energy-** the energy that holds an atomic nucleus together, measured by the force that must be overcome to split the nucleus (fission) resulting in a nuclear reaction
* **Biodegradable:** describes a material that can be decomposed into a harmless form by the biological action of organisms such as bacteria.
* **biogas-** mixture of gases mostly methane, produced when biomass is allowed to rot in the absence of air.
* **Biomass:** organic material from such sources as wood, corn, and wastes from animal and crops; biomass is the source of biogas and the ethanol used in gasohol.
* **boiling point** - the temperature at which a substance changes from a liquid to a gas
* **Boyle’s law:** states that the volume of a gas decreases when the pressure increases, provided the temperature stays the same.
* **brightness** - measures the amount of light reaching Earth
* **brittleness** - a tendency to crack or break; the opposite of elasticity
* **bubble chamber:** device filled with superheated liquid; used to detect and monitor the path of charged nuclear particles, which leave a trail of bubbles as the pass through the chamber.
* **buoyancy** - the measure of the upward force a fluid exerts on a submerged object
* **butane:** a flammable gas (C4H10); a part of natural gas.
* **Byte:** a basic unit of computer memory that represents a character (number, symbol, or alphabet letter); consists of 8 bits

**C**

* **calorie** - a unit of energy equal to 4.184 Joules, or the energy needed to heat 1 gm of water 1 deg
* **calorimeter:** an instrument used to measure changes in the thermal energy
* **carbohydrates** - energy rich sugars and starches
* **carbon 14 dating:** dating: age determining method for carbon containing objects up to 50,000 years old; works by calculating the amount of carbon 14 remaining in the object
* **catalysts** - a chemical that allows a reaction to have a much lower activation energy that what it normally has
* **cathode ray tube (CRT):** sealed glass vacuum tube that uses electrons and fluorescent material to produce images on a screen
* **cations-** a positively charged ion; symbol placed in the first position when writing the formula of a chemical compound
* **cellular respiration** - the reactions in cells that release energy from glucose
* **celsius scale** - temperature scale in which water freezes at 0 deg and boils at 100 deg.
* **centripetal acceleration:** acceleration toward the center of a circle by an object moving along a circular path.
* **centripetal force –** the force that causes an object moving along a circular path to move toward the center of the path.
* **ceramic –** a material made from dried clay or claylike mixtures.
* **cermet:** a tough, heat-resistant material that has the properties of both a ceramic and an alloy; ceramic-metal.
* **chain reaction –** a continuing series of fission reactions in which neutrons from fissioning nuclei cause other nuclei to split, releasing more neutron, which split more nuclei, and so on.
* **charged** - a condition where there is an excess of positive or negative charge
* **Charles law:** states that the volume of a gas increases when temperature increases, provided the pressure stays the same.
* **chemical bond** - a bond formed between two atoms from the sharing or transferring of electrons
* **chemical change** - transforms one kind of matter into another kind, which may have different properties
* **chemical equation** - an equation of chemical formulas that shows the exact numbers of atoms and compounds in a chemical reaction
* **chemical formula** - identifies the number and element of each type of atom in a compound
* **chemical precipitation-** the formation of a solid from a solution
* **chemical properties** - characteristics of matter that can only be observed when one substance changes into a different substance, such as iron into rust
* **chemical reaction-** a process in which the atoms of one or more substances are rearranged into new substances
* **chemical symbol:** a shorthand way to write the name of an element; for example: C for carbon
* **chemically stable:** describes an atom whose outermost energy level is not filled with electrons so it seeks electrons from other atoms and thus forms compounds.
* **chlorofluorocarbon (CFC):** a group of compounds whose decomposition releases chlorine atoms that destroy ozone molecules in the upper atmosphere
* **circuit breaker:** a device that protects electrical circuit from too much current flowing by opening to stop the flow
* **circuit:** a closed path through which electrons flow
* **cloud chamber:** device filled with water or ethanol saturated air; used to detect charged nuclear particles, which leave a trail as they pass through
* **coagulation:** process that destroys colloid structure; can be used to reduce a colloidal from of air pollution.
* **coefficient-** whole numbers written in front of individual compounds or atoms within a chemical equation indicating the relative amounts of each for the purpose of balancing the equation
* **coherent light:** a beam of light in which all the electromagnetic waves travel with the crests and the troughs aligned so the beam does not spread out
* **colloid:** a heterogenous mixture containing tiny particles that never settle out; for example, milk and gelatin.
* **combustion reaction-** a chemical reaction using oxygen and producing heat and/or light
* **comet -** an object in space made mostly of ice and dust
* **compound** - a substance whose smallest particles include more than one element chemically bonded together
* c**ompression** - a squeezing force that can act on a spring
* **compression/longitudinal waves-** waves that have vibrations along or parallel to their direction of travel
* **concave lense;** lense that is thinner in the maddle and thicker at the edges and thus curve inward; from virtual, upright, smaller images of an object.
* **concave mirror:** a mirror those surface curves inward; produces real images
* **concentration-** a measure of the amount of dissolved substance contained per unit of volume
* **conclusion** - a statement of what was learned in an experiment or observation
* **condensation:** the change of a substance from a gas to a liquid, which usually takes place when a gas is cooled to or below its boiling point.
* **condense:** to go from the gas state to the liquid state, due to a loss of heatcondensation - change from gas to liquid at a temperature below the boiling point
* **conduction:** the transfer of energy through matter in which energy moves from particle to particle; conduction takes place more easily in solids than in liquids and gases
* **conductor-** any matter that allows the flow of electrical current or heat
* **constant speed** - the speed of an object that travels the same distance each second
* **constant:** in an experiment, a factor that doesn’t change.
* **contraction:** the movement of molecules toward one another
* **control:** in an experiment, a standard for comparison that is often needed to draw a meaningful conclusion
* **controlled variable** - a variable that is kept constant in an experiment
* **convection** - the transfer of heat through the motion of fluids such as air and water
* **convex lense –** lense that is thicker in the middle than at the edges; can produce both real and virtual images
* **convex mirror:** a mirror with a surface that curves outward; produces upright, smaller, virtual images of an object.
* **corrosive:** hazardous compound that attacks and alters metals, human tissue, or other material; for example, oven cleaners and batteris
* **coulomb:** the charge carried by 6.24 x 1018 electrons
* **Coulomb's law-** the principle that the force between two point charges acts in the direction of the line between them and is directly proportional to the product of their electric charges divided by the square of the distance between them
* **covalent bond-** type of chemical bond where electrons are shared
* **crest:** the highest point of a wave
* **critical temperature:** in superconductors, the very low temperature at which a material ceases to have any electrical resistance.
* **crystalline** - solids that have an orderly, repeating pattern of molecules or atoms
* **current-** the rate of flow, as in electrical charges or water

**D**

* **data** - information collected during an experiment
* **deceleration:** the rate of change in velocity when velocity is decreasing; also known as negative acceleration
* **decomposition reaction-** a chemical reaction in which a single compound reacts to produce two or more products (AB🡪 A + B)
* **deduce** - to figure something out from known facts using logical thinking
* **dehydrating agent:** a substance that can remove water from materials
* **density-** amount of mass per volume of a given amount of matter
* **dependent variable** - in an experiment, a variable that responds to changes in the independent variable
* **derived unit:** unit of measurement obtained by combining measurements; example: density and area.
* **detergent:** an organic salt similar to soap, except that detergents don not form soap scum in hard water.
* **diatomic molecule:** a molecule composed of two atoms of the same element
* **diesel engine:** an internal combustion engine that compresses a fuel air mixture somcu that it ignites from the heat of compression without a spark
* **diffraction-** the bending of a wave around a barrier
* **diffraction grating:** a piece of glass or plastic with many parallel slits that act like a prism, causing white light that passes through it to separate into its component colors
* **dilute solution:** a solution in which the amount of solute is much less than the maximum the solvent
* **diode:** a type of rectifier that allows electric current to flow in only one direction.
* **direct current:** electrical current that flows in onlyu one direction through a wire (DC)
* **disinfectant;** a chemical that kills bacteria, such as alcohol
* **dispersion-** separation of a wave or radiation into its individual components like separation of light into colors by a prism
* **dispersion forces-** weak forces between atoms or molecules resulting from the movement of electrons in the electron cloud around the system
* **dissociation:** the breaking apart of an ionic compound into positive and negative ions when dissolved in water
* **dissolve** - to separate and disperse a solid into individual molecules or ions in the presence of a solvent
* **distance** - the amount of space between two points
* **doppler effect:** an increase or decrease in wave frequency, caused by motion of the source
* **dot diagram:** a diagram to represent electrons in the outer energy level of an atom; uses the element symbol and dots.
* **double displacement reaction:** a chemical reaction in which two ionic compounds react and completely switch ion that it bonds with
* **dry cell:** a power source that acts as an electron pump and generates electric current by a chemical reaction
* **ductile:** ability of metals to be pulled into wires
* **ductility** - the ability to bend without breaking

**E**

* **effervescence-** bubbling of a solution due to the escape of a gas either produced by a chemical reaction or a gas coming out of solution as in a carbonated beverage
* **efficiency:** The ratio of the useful work put out by a machine to the work put into that machine
* **effort arm:** the part of a lever on which an effort force is applied
* **effort force:** the force applied to a machine when a machine is used to do work
* **elasticity** -the ability to be stretched or compressed and then return to original size
* **electric charge** - a fundamental property of matter that comes in two types called positive and negative
* **electric field:** an area surrounding an electron that exerts a force on anything nearby with an electric charge; is strongest nearest the electron and weakens with distance
* **electric power:** the rate at which electrical energy is converted to another form of energy
* **electrical conductor** - a material that allows electricity to flow through easily
* **electricity-** current generated by the flow of electrons through a circuit
* **electrolyte:** a substance that separates or forms ions in water, making the solution an electrical conductor
* **electromagnet:** strong temporary magnet made by inserting an iron core into a wire coil and passing an electric current through the coil
* **electromagnetic force-** a fundamental force arising from the attractions and repulsions of the magnetic and electrical fields
* **electromagnetic induction:** process by which electrical current is induced in a wire when it moved through a magnetic field
* **electromagnetic radiation-** a form of energy with wave properties which can travel through a vacuum at a characteristic speed of 3.00 X 108 meters per second
* **electron -** a particle with an electrical charge, -e, found inside of atoms but outside the nucleus
* **electron cloud:** region where electrons most probably are found surrounding the nucleus of an atom
* **electron configuration-** specific arrangement of electrons in the orbitals of an atom
* **electronegativity-** a measure of the tendency of an atom to attract electrons
* **electroscope:** a device containing two suspended metal leaves in a jar that move apart whan charged
* **element** - a pure substance
* **elementary charge** - the smallest unit of electric charge that is possible in ordinary matter represented by e
* **emission spectrum-** the range of electromagnetic radiation produced by a source
* **endothermic reaction** - a reaction if it uses more energy than it releases
* **energy** - a quantity that measures the ability to cause change in the physical system - measured in Joules
* **energy farming:** the growing of plants for use as fuel
* **energy level-** one of a quantized series of states of the electrons within an atom separated from others in the series by distinct quantities of energy
* **entropy-** measure of the randomness in a system
* **enzymes** - special proteins that are catalysts for chemical reactions in living things
* **equilibrium** - occurs when a solution has maximum concentration of dissolved solute; the dissolving rate equals the rate at which molecules come out of solution; state in which the net force is zero
* **Error** - the difference between a measurement and the true value
* **ester:** an organic compound formed by reacting organic acid with an alcohol
* **Evaporation** - change from liquid to gas at a temperature below the boiling point
* **Exothermic reaction-** a reaction is exo if it releases more energy than it uses
* **experiment** - a situation specifically set up to investigate relationships between variables
* **experimental variable** - a variable that changes in an experiment
* **external combustion engine:** an engine in which the fuel is burned outside the engine

F

* **factor:** a condition that affects the outcome of an event
* **farhenheit scale** - the temperature scale on which 32 and 212 are the freezing and boiling point of water
* **farsighted:** describes a person who sees faraway things clearly, but has trouble focusing on nearby objects
* **fats** - energy rich hydrocarbon chain molecules
* **fiberglass:** hairlike strands of glass that make a good insulator when arranged in puffy layers
* **filter:** in working with light, a device that allows one or more colors to be transmitted while others are absorbed or blocked.
* **first law of thermodynamics-** law stating the change of energy of a system is equal to the heat transferred minus the work done
* **first order rate-** the rate of decay is proportional to the concentration raised to the first power; there is a negative linear relationship between the log of the sample isotope concentration versus time
* **flame test:** a laboratory test to identify elements by heating a substance in a flame and observing the flame color
* **flammable:** a chemical characteristic of a substance that allows it to oxidize rapidly; also called burnable
* **fluid** - a form of matter that flows when any force is applied, no matter how small
* **fluorescence:**  occurs when a materal absorbs ultraviolet radiation that stimulates it to radiate visible light
* **force** - a push, pull, or any action which has the ability to change motion - measured in Newtons
* **fractional distillation** - A process based on boiling points used in oil refineries to separate the chemical compounds in crude oil into gasoline, kerosene, and other products.
* **fractionating towers** - Towers at oil refineries used for fractional distillation of petroleum.
* **free body diagram** - a diagram showing all the forces acting on an object
* **free fall** - the motion of an object acted upon only by the force of gravity
* **freon** A refrigerant gas used in refrigerators and air conditioners.
* **frequency -** 1. in general use, the number of regularly occurring events per unit of time
* **frequency modulated** - Radio waves whose frequency is varied with voice, music, video, or data for transmission over long distances.
* **frequency** The number of wave crests that pass a point during one second; expressed in hertz.
* **friction** - a force that resists the motion of objects over surfaces
* **friction** The force that opposes motion between two surfaces that are touching each other.
* **fuel rod** - A metal rod filled with uranium pellets, used as the fuel in a nuclear reactor.
* **fulcrum** The fixed point around which a lever pivots.
* **fundamental force-** any of four forces that act between bodies of matter and that are mediated by one or more particles; in order of decreasing strength: the strong force, the electromagnetic force, the weak force, and gravity
* **fuse** A device that protects an electrical circuit.

G

* **galaxy** - a group of stars, dust, gas, and other objects held together by gravitational forces
* **galvanometer** An instrument used to detect electric currents.
* **gamma radiation-** form of radiation emitted from the nucleus in high energy waves; may be blocked by a thick layer of lead
* **gamma rays** - High frequency electromagnetic waves that travel at the speed of light, have no mass or charge, and are the most penetrating form of radiation.
* **gas-** state of matter without a definite shape or volume
* gas planets - Jupiter, Saturn, Uranus, and Neptune
* **gaseous solution** - A homogeneous gas that is composed of two or more gases.
* **gasohol** A mixture of ethanol and gasoline that is a useful substitute forgasoline, but whose production may be damaging to the environment; a biomass fuel.
* **gear** A wheel with teeth around its edge designed to mesh with teeth on another gear so as to transfer force and motion.
* **gelatin** A substance obtained by boiling animal bones; used in glues and goods.
* **generator** A device that uses electromagnetic induction to induce electrical current by rotating loops of wire through a magnetic field.
* **geothermal energy** - Thermal energy source located far below Earth's crust.
* **glass** A ceramic mixture with no regular crystal structure.
* **graduated cylinder** - A cylinder marked with volume scale, used in laboratories for measuring liquid volumes.
* **gram** - a unit of mass smaller than a kilogram, one kg equals 1,000 g
* **graph** A visual display of information or data organized to help people interpret, understand, or quickly find information.
* **graphite** A mineral made of carbon atoms arranged in layers that easily slide past one another, forming a dry lubricant.
* **gravitational force-** fundamental force that tends to draw two masses together, increasing as the masses are increased or distance between them is decreased
* **gravitational potential energy-** the amount of stored energy an object has based on its position relative to Earth (GPE = mgh)
* **gravity** Force exerted by every object in the universe on every other object. The amount of force depends on the masses of the objects and the distance between them.
* **ground state-** position of an electron in its lowest possible energy level within an atom
* **grounded** Electrically connected to Earth, either directly or through a wire or other metal object.
* **group** In the periodic table, each of the 18 vertical columns of elements; each group is made up of elements with similar properties.

**H**

* **hacker** A person who uses a computer to break into other computer systems without permission.
* **half life** - The amount of time required for one-half of the nuclides in a sample of radio isotope decay
* halogens - elements in the group containing fluorine, chlorine, and bromine among others
* **halogens** - highly active elements in periodic table Group 17; they have seven electrons in their outer shells and readily combine with Group 1 elements.
* **heat -** energy transfer between two objects of different temperature
* heat conduction - the transfer of heat by the direct contact of particles of matter
* **heat engine** - A device that converts thermal energy that is produced by burning fuel into mechanical energy.
* **heat mover** - A device that moves thermal energy from one location and releases it in another location having a different temperature.
* **heat of fusion** - The amount of energy needed to change a material from the solid state to the liquid state.
* **heat of vaporization** - The amount of energy needed to change a material from a liquid to a gas.
* **herbicide** A chemical poison that kills undesirable plants.
* **hertz** The unit of measure for frequency.
* **heterogeneous mixture** - A mixture in which different parts can be easily distinguished.
* **homogeneous mixture** – A mixture in which different materials are blended evenly so that the mixture is the same throughout; also called a solution.
* **hydrate** A compound that has water molecules chemically attached to its ions and written into its formula.
* **hydraulic** Describes a system operated by the energy of moving water.
* **hydrocarbon** A compound containing only carbon and hydrogen atoms.
* **hydrogen bonding-** bond formed when hydrogen in a molecule is attracted to a more electronegative atom, such as oxygen or nitrogen, in another molecule
* **hydronium ion** - The ion that makes a solution acidic.
* hypothesis - an unproven, or preliminary, explanation that can be tested by comparison with scientific evidence
* **hypothesis** A testable prediction used to see how something works or to solve a problem.

**I**

* **ideal machine** - A machine in which work input equals work output; such a perfect machine would be frictionless and 100 percent efficient
* **incandescent light** - Light produced by a thin tungsten wire, or filament, that is heated in an incandescent bulb until it glows.
* **inclined plane** - A simple machine consisting of a sloping surface used to raise objects.
* **incoherent light** - Light rays that are nearly parallel, but spread out because their electromagnetic waves do not travel in the same direction.
* **independent variable** - In an experiment, the factor adjusted to a different value by the experimenter to see what effect it will have on the dependent variable.
* **indicator** An organic compound that changes color in an acidic solution or a basic solution.
* **induced dipole interaction-** temporary condition in which the positive part of a polar molecule attracts the negative part of another molecule
* **induction** Electrically charging an object or creating an electrical current in it, without physically touching it.
* **inertia** The tendency of an object to resist any change in its motion. If motionless, it tends to remain at rest; if moving, it tends to keep moving at the same speed and in the same direction.
* **infrared radiation** - Electromagnetic waves that have a wavelength slightly longer than visible light; indicates the presence of heat.
* **infrasonic waves** - Waves at frequencies below the limit of human hearing.
* **inhibitor-** substance that prevents or slows down a chemical reaction or resists the transfer of heat or electricity
* **inhibitor** A substance that slows or prohibits a chemical reaction.
* **inquiry** - a process of learning that starts with questions and proceeds by seeking the answers to the questions
* **insoluble** - a substance is insoluble in a particular solvent if it does not dissolve in that solvent
* **instantaneous speed** - The rate of motion at a given instant in time.
* **insulator** A material that does not allow heat or electrons to move through it easily.
* **integrated circuit** - A thin slice of silicon, often less than 1 cm on a side, which can contain thousands of resistors, diodes, and transistors; used in computer and electronic equipment.
* **intensity** In sound waves, the amount of energy in each wave.
* **interference-** when two or more waves combine to produce a new wave; constructive interference is when the waves add to produce a greater amplitude; destructive interference is when the waves add to produce a smaller amplitude
* **interference** The ability of two or more waves to combine to form a new wave.
* **intermolecular attraction-** force of attraction between two or more molecules that produces a weak bond
* **intermolecular forces** - forces between separate atoms and molecules that are attracted at a distance but repulsive at close range
* **internal combustion engine** - An engine in which fuel is burned inside the engine in chambers.
* **ion-** electrically charged atom or group of atoms formed by the loss or gain of one or more electrons
* **ion** A positively or negatively charge atom.
* **ionic bond** - A type of chemical bond formed by the attraction between opposite charges of the ions in an ionic compound.
* **ionic bond-** type of chemical bond involving the transfer of electrons and the formation of ions; can often form between a metal and a non-metal
* **ionic compound-** compound where two or more ions are held next to each other by electrical attraction
* **ionization** The breaking apart of certain polar substances to form ions when dissolved in water.
* **isomers** Compounds that have identical chemical formulas but different molecular structures and shapes.
* **isotopes-** atoms having the same number of protons (atomic number) but having different numbers of neutrons
* **isotopes** Atoms of the same element that have different numbers of neutrons.

**J**

* **joule** The basic unit of energy and work in the metric SI system.

**K**

* **kelvin** The SI unit of temperature.
* **kilogram** – kg - the basic metric SI unit of mass
* **kilowatt hour** - The unit of electrical energy.
* **kinetic energy** - Energy in the form of motion based on its motion (KE = ½mv2)
* **kinetic theory of matter** - The idea that all matter is made up of constantly moving, tiny particles.

**L**

* **lanthanide** Any of the 14 metallic elements having atomic numbers 58-71; used in magnets, ceramics, and television picture tubes.
* **laser** A device that emits a beam of photons that travel in the same direction and phase, producing a beam of coherent light.
* **Law of conservation of energy** - A law stating that energy can change form but cannot be created or destroyed under ordinary conditions.
* **Law of conservation of mass** - A law stating that matter is neither created nor destroyed during a chemical change.
* **law of conservation of matter and energy-** matter and energy cannot be created or destroyed, it can only be rearranged or transferred; thus the amount of energy and matter is constant in the universe
* **Law of conservation of momentum** - A law stating that the total momentum of a group of objects is conserved unless a net force acts on the objects.
* **lever** A simple machine consisting of a bar that is free to pivot around a fixed point.
* light year- the distance light travels in one year - 9.5 trillion km
* **line graph** - A type of graph used to show trends or continuous change by drawing a line that connects data points.
* **lipids** Fats, oils, and related organic compounds.
* **liquid-** state of matter having a definite volume, but not a definite shape
* **liquid solution** - A liquid solvent that has dissolved in it a gas, liquid, or solid.
* **liter** The unit of liquid volume that occupies the same volume as a cubic decimeter and is slightly larger than a quart.
* **longitudinal/compression waves-** waves that have vibrations along or parallel to their direction of travel
* **loudness** The human perception of sound intensity.
* **lubricant** A substance used to reduce friction between two surfaces that move together; for example, oil, grease, or graphite.
* **luminosity** - the total amount of light given off by a star

**M**

* **machine** A device that makes work easier by changing the size of the force applied to it and/or tthe force.
* **magnetic bottle** - A powerful magnetic field that creates a container to hold the hydrogen plasma needed for a nuclear fusion reaction.
* **magnetic domains** - Groups of atoms with aligned magnetic poles.
* **magnetic field-** region of space near a magnet, electric current, or moving charged particle in which a magnetic force is produced
* **magnetic field** - The region around a magnet where magnetic forces act.
* **magnetic poles** - The two ends of a piece of magnetic material where the magnetic forces are strongest, labeled north pole and south pole.
* **magnifier** A device that makes things appear larger so that more detail can be seen; for example, a microscope.
* **magnitude** - describes the size component of a vector
* **main sequence star** - a stable star in the HR diagram
* **malleable** Ability of metals to be hammered or rolled into thin sheets.
* **mass** A measurement of the amount of matter in an object.
* **mass number** - Sum of the number of protons and neutrons in an atom's nucleus.
* **matter-** anything that has mass and takes up space
* **mechanical advantage** - The number of times a machine multiples the effort force applied to it.
* **mechanical energy-** sum of the potential and kinetic energy present in a system
* **mechanical energy** - The total amount of kinetic energy and potential energy in a system.
* **Medium -** A material through which a wave travels.
* **melt** The changing of a substance from a solid state to a liquid state when heated above the substance's freezing/melting point.
* **melting point** - The temperature at which a solid changes to a liquid.
* **metal-** any element that is usually shiny, a good conductor of heat and electricity, can be melted or fused, hammered into thin sheets or drawn into wires, and usually forms cations
* **metallic bonding** - The type of chemical bond in which positively charged ions are surrounded by freely moving electrons.
* **metalloids** Elements having properties of both metals and nonmetals.
* **metals** Elements usually having these common properties: shiny, good conductors of heat and electricity, are solids at room temperature.
* **Meteor** - a chunk of burning rock traveling through Earth's atmosphere
* **Meteorite** - a meteor that passes through Earth's atmosphere and strikes the ground
* **meter** The SI base unit of length.
* **microprocessor** The computer's "brain." It receives input and tells the computer how to respond.
* **microscope** A optical instrument that uses two convex lenses with relatively short focal lengths to magnify small, close-up objects.
* **microwaves** Radio waves with the highest frequency and energy; used in communications and microwave ovens.
* **Mixture** - a substance that includes more than one type of element and or compound
* **mixture** A material made of elements or compounds stirred together but not combined chemically.
* **model** A symbolic representation of an idea, system, or structure to make something understandable.
* **modulation** Process of adding voice, music, video, computer information, or other data to radio waves by using electrical currents to vary either amplitude or frequency.
* **molar mass-** mass of a formula, the sum of the component atomic masses expressed in grams per mole
* **mole-** amount of a substance, expressed in grams, that contains 6.022 × 1023 (Avogadro's number) atoms, molecules, ions, or other elementary units
* **molecular compound-** two or more covalently bonded atoms (typically bonding between non-metals)
* **Molecule** -a group of atoms held together by covalent bonds in a specific ratio and shape
* **momentum-** quantity expressing the motion of a body or system equal to the product of its mass and velocity
* **momentum** A property of any moving object; the product of an object's mass and velocity.
* **monomers** Organic molecules that are strung together to form polymers.
* **music** Sound created using specific pitches, sound quality, and regular patterns.
* **Mutation** - change in the sequence of base pairs in DNA that may be passed on to successive generations

**N**

* **natural law** - the set of rules that are obeyed by every detail of everything in the universe, including living creatures and human technology
* **nearsighted** Describes a person who sees nearby things clearly, but has trouble focusing on distant objects.
* nebula - a huge cloud of dust and gas from which stars form
* **negative charge-** particle having more electrons than protons
* **net force-** sum of all forces acting on an object
* **neutral** - a condition where the total positive charge is canceled by the total negative charge - matter is neutral most of the time
* **neutral charge-** particle having an equal number of electrons and protons
* **neutralization** A chemical reaction between an acid and a base.
* **neutralize** To change an acidic solution or a basic solution so that it is neutral.
* **neutron** Atomic particle with no charge that is part of an atom's nucleus.
* **Newton's first law of motion** - Describes the relationship between velocity and forces. An object moving at a constant velocity keeps moving at that velocity unless a net force acts on it.  
  **Newton's second law of motion** - Describes the acceleration of an object in the direction of the net force applied to it.
* **Newton's Law of Universal Gravitation** - the force of gravity between objects depends on their masses and the distance between them
* **Newton's third law of motion** - Describes action-reaction pairs; for every action force, there is an equal and opposite reaction force.
* **NIMBY** Not in my backyard; a point of view that supports an issue such as nuclear generation of electricity as long as it does not take place close to home.
* **noble gas-** any of the six gases helium, neon, argon, krypton, xenon, and radon; the outermost electron shell of atoms of these gases is full, so they do not react chemically with other substances except under certain special conditions
* **noble gasses** - elements in the group containing helium, neon, and argon among others
* **noise** Sound that has no regular pattern or definite pitch.
* non metal - elements that are poor conductors of heat and electricity
* **nonelectrolyte** A substance, such as pure water, that does not conduct electricity.
* **nonmetals** Elements that usually are gases or brittle solids at room temperature; most do not conduct heat or electricity well.
* **nonpolar bond-** a covalent bond in which a pair of electrons shared by two atoms is held equally by both atoms
* **nonpolar molecule** - A molecule that does not have oppositely charged ends.
* **nonrenewable resources** - Resources such as coal, oil, and natural gas, which cannot be replaced after they are used up.
* **normal force** - the force a surface exerts on an object that is pressing on it
* **normal -** In the study of light, an imaginary line drawn perpendicular to a reflecting surface or perpendicular to a medium that light is entering.
* **nuclear equation-** shorthand method representing a nuclear reaction
* **nuclear fission** - Process in which an atom's nucleus is split into two nuclei with smaller masses.
* **nuclear fusion** - Process in which two atomic nuclei with low masses are fused into a single nucleus of larger mass; also known as a thermonuclear reaction.
* **nuclear reaction** - a process that changes the nucleus of an atom and may turn one element into a completely different element
* **nuclear reactor** - A device that generates electricity from a controlled nuclear fission chain reaction.
* **nuclear waste** - Radioactive by-products from nuclear power generation, nuclear medicine, and so on; storing it is a political and environmental problem.
* **nucleic acid** - An organic polymer that controls the activities and reproduction of cells.
* nucleic acids - biological molecules such as DNA that have the ability to store the genetic code
* **nucleon-** a proton or neutron
* **nucleus** The positively charged center of an atom that contains protons and neutrons.
* **nuclide** The nucleus of a specific isotope having a certain specific atomic number and atomic mass.

**O**

* **objective** - describes evidence that documents only what actually happened as exactly as possible
* **observation** Using your senses to gather information.
* **ocean thermal energy conversion** - Process that uses heat engines to convert differences in ocean temperatures into mechanical energy to drive turbines.
* **ohm** The unit for measuring resistance.
* **Ohm's law-** for any circuit, the electric current (I) is directly proportional to the voltage (V) and is inversely proportional to the resistance (R), V = IR
* **opaque materials** - Materials you can't see through because they absorb or reflect all light.
* **Optical axis** - A line perpendicular to the center of a mirror or lens.
* **optical fiber** - Transparent glass fiber that can transmit light from one place to another.
* orbit - the motion of one object around another caused by gravitational force
* organic chemistry - the chemistry of carbon and carbon compounds
* **organic compounds** - Chemical compounds that contain the element carbon.
* **organic solvent** - A type of liquid often found in building materials; contains potentially harmful chemicals.
* origin - a fixed reference point
* **oxidation number** - A positive or negative number that indicates how many electrons an atom has lost, gained, or shared when bonding with other atoms.
* **oxidation-reduction reaction-** type of chemical reaction that involves loss of electrons from one reactant and gain of electrons by another

**P**

* **parallel circuit** - An electrical circuit where the current flows through more than one path. If one path is interrupted, current will still flow through the other paths
* **period-** 1. in geology, the basic unit of geologic time 2. in physics, the duration of one complete cycle of a wave or oscillation; the reciprocal of the frequency 3. in chemistry, a horizontal row on the periodic table
* **periodic table-** table illustrating the periodic system, in which the chemical elements, formerly arranged in the order of their atomic weights and now according to their atomic numbers, are shown in related groups
* **Periodicity** - the repeating pattern of chemical and physical properties of the elements
* **permanent dipole interaction-** permanent condition in which the positive part of a polar molecule attracts the negative part of another molecule, such as the interaction between water molecules
* **pH-** used to express the acidity or alkalinity of a solution on a scale of 0 to 14 where 7 is neutral; calculated as the logarithm of the reciprocal of hydrogen ion (hydronium) concentration of a solution
* **phases of matter** - the different forms matter can take; commonly occur as solid, liquid, or gas
* **physical properties-** can be observed or measured without changing the composition of matter
* **pitch** The highness or lowness of a sound, which is determined by the frequency of the sound waves.
* **plane mirror** - A mirror with a flat surface that produces a virtual image.
* **planet** - a massive object orbiting a star like the Sun
* **planetary nebula** - the expanding outer shell of a Sun-like star; this matter is blown away as the core shrinks to become a white dwarf
* **planetary satellite** - small body of matter that orbits a planet
* **planetary system** - a star and its planets
* **plankton** Tiny plants and animals that live in water and are food for small fish; they are easily killed by acid rain.
* **plasma-** highly ionized gaseous state of matter containing an approximately equal number of positive ions and electrons
* **plastic polymer**-based material that can be easily molded.
* **pOH-** the logarithm of the reciprocal of hydroxide ion concentration of a solution
* **polar** - describes a molecule that has charge separation like water
* **polar bond-** covalent bond in which a pair of electrons are shared unequally between bonded atoms
* **polar molecule** - A molecule with opposite charges on each end.
* **polarized light** - Light in which the transverse waves vibrate only along one plane.
* **polarizing filter** - A filter made of chains of molecules in parallel rows that will transmit only light waves vibrating in the same direction as the molecular chains.
* **polluted water** - Water that contains high levels of unwanted substances that may be harmful to living things.
* **polyatomic ion** - A group of covalently bonded atoms in which the whole group is positively or negatively charged.
* **polymer** A huge molecule made up of many smaller organic molecules, called monomers, that have formed new bonds and are linked together.
* Polymerization - a series of addition reactions that join small molecules into large chain molecules
* Position - the location of an object compared to a reference point
* **positive charge-** particle having more protons than electrons
* **positron** A positively charged particle similar to an electron.
* **potential difference** - The difference in electric potential energy between two different points; measured in volts.
* **potential energy-** energy stored mechanically, chemically, in an electrical device, or by virtue of its position
* **potential energy** - Stored energy.
* **power** The measure of the amount of work done in a specific amount of time.
* Precipitate - a solid product that comes out of solution in a chemical reaction
* **precipitate** An insoluble compound formed during a double-displacement reaction.
* **precise-** using very exacting standards of measurement with the equipment available; a measurement is consistent
* **precision-** the reproducibility of an observer's measured values, the amount of agreement among a series of individual measurements, values, or results
* Pressure - a distributed force per unit area that acts within a fluid
* **pressure** The amount of force exerted per unit of area.
* **pitch** The highness or lowness of a sound, which is determined by the frequency of the sound waves.
* **principle** A basic rule or law describing how something always works in the natural world.
* **principle energy levels-** first of the four quantum numbers; a measure of the energy contained in an electron
* **Procedure** - a description of an experiment that details the equipment used, the techniques used, and the data collected
* **product-** substance formed in a chemical reaction
* **projectile** Any object shot or thrown through the air.
* **propane** A flammable gas and a part of natural gas.
* **protein** Organic polymer formed from amino acids.
* **protein synthesis** - using the information in DNA to assemble proteins from amino acids
* **proton** Atomic particle with a positive charge that is part of an atom's nucleus.
* **Protostar** - the first stage in the life cycle of a star
* **pulley** A simple machine consisting of a grooved wheel with a rope or a chain running along the groove.

**Q**

* **quality** In sound, the difference among sounds of the same pitch and loudness.
* **quarks** Very small particles of matter that make up protons and neutrons; presently six different types are known.

**R**

* **radiation** The transfer of energy in the form of waves. It is a type of energy transfer that does not require matter.
* **radiator** A device with a large surface area that transfers heat to surrounding air by conduction.
* **radio waves** - Electromagnetic waves that have long wavelengths and are used in communications.
* Radioactive - a nucleus is radioactive if it spontaneously breaks up emitting particles or energy in the process
* **radioactive element** - An unstable element whose nucleus brakes down and gives off particles, radiation, and energy.
* **radioactive isotopes-** unstable atomic nuclei that spontaneously disintegrate, emitting alpha, beta, or gamma radiation
* **radioactivity** The emission of high-energy radiation or particles from the nucleus of a radioactive atom.
* **RAM** In a computer, temporary memory that is lost when the computer is turned off.
* **rarefaction** In compressional waves, the less dense area of the wave.
* **reactant-** substance that is altered in a chemical reaction
* Reactants - the substances that are combined and changed in the chemical reaction
* **reactants** The starting substances in a chemical reaction.
* **real image** - An image produced where light rays converge, as with a concave mirror or convex lens.
* **rectifier** Any device that converts alternating current into direct current.
* red giant - a large star with low temperature and high brightness
* **reflecting telescope** - An optical instrument that uses a concave mirror, a plane mirror, and a convex lens to magnify distant objects.
* **reflection-** the return of waves or particles from surfaces they strike
* **refracting telescope** - An optical instrument that uses two convex lenses to magnify distant objects.
* **refraction-** the change in direction of a wave as it passes from one medium to another; the bending of waves, caused by changing their speed.
* **Repeatable** - describes evidence that can be seen independently by others if they repeat the same experiment or observation in the same way
* **replacement reaction, double-** chemical reaction in which two compounds react by switching partners to form two new compounds (AB + CD 🡪 AD + CB)
* **resistance -** opposition to motion as in the flow of electrons or the flow of fluids
* **resistance arm** - The part of a lever that exerts the resistance force.
* **resistance force** - The force exerted by a machine to overcome resistance to gravity or friction.
* **resonance** The tendency of an object to vibrate at the same frequency as another vibrating source.
* **reverberation** The echoing effect produced by multiple reflections of sound.
* **RNA** - A nucleic acid that controls production of proteins that make new cells.
* **ROM** In a computer, it is permanent memory stored inside the computer, even when the power is turned off.

**S**

* **salt -** A compound formed during a neutralization reaction when negative ions from an acid combine with positive ions from a base.
* **saponification -** The process of making soap.
* **Saturated** - a solution is saturated if it contains as much solute as the solvent can dissolve
* **saturated fat** - a fat molecule in which carbon is bonded with two hydrogen atoms
* **saturated hydrocarbon** - A hydrocarbon that contains only single-bonded carbon atoms; an example is propane.
* **saturated solution** - A solution that has dissolved all the solute it can normally hold at a specific temperature.
* **scalar-** physical quantity that has magnitude but no direction
* **scientific inquiry-** the diverse ways in which scientists pose questions about the natural world
* **scientific investigations-** the diverse ways in which scientists study problems within the natural world
* **scientific law** - A rule that describes, but does not explain, a pattern in nature and predicts what will happen under specific conditions.
* **scientific method** - a process of learning that begins with a hypothesis and proceeds to prove or change the hypothesis by comparing it with scientific evidence
* **second law of thermodynamics-** spontaneous processes occur in nature; in a closed system, energy is released and entropy increases
* **second -** the SI unit for time.
* **semiconductor -** an element that conducts electricity under certain conditions.
* **series circuit** - an electrical circuit where the current has only one path. If the path is interrupted in any point, it stops current flow in the entire circuit.
* **SI Standard**, easy to use, worldwide system of measurement based on powers of ten. The standards are used by all scientists, and are a modern version of the metric system.
* **Significant -** a difference between two measured results is significant if the difference is greater than the error in measurement
* **simple machine** - A device that accomplishes work with only one movement. The lever, pulley, wheel and axle, inclined plane, screw, and wedge are all examples.
* **single displacement reaction** - A chemical reaction in which one element replaces another element in a compound.
* **sliding friction** - the friction force that resists the motion of an object moving across a surface
* **slope** - the ratio of the rise to the run of a line on a graph
* **Snell's law-** law that predicts how much refraction occurs when a light ray passes from one transparent material to another, based upon the index of refraction for each material
* **soap** An organic salt made by reacting fats or oils with a strong base such as sodium hydroxide.
* **solar collector** - A device that absorbs radiant energy from the sun that can be converted to thermal energy and used to heat buildings.
* **solar energy** - Energy from the sun. It is free and can be converted into thermal energy to heat homes and other buildings.
* **solar system** - the Sun, planets, and their moons, and other objects that are gravitationally bound to the Sun
* **solid-** state of matter with a definite shape and volume
* **solubility** - the amount of a substance that will dissolve in a solvent; generally expressed as the maximum number of grams of solute that will dissolve in 100 g of a solvent at a specific temperature.
* **solute** - the substance being dissolved in a solvent.
* solution - a mixture of two or more substances that is uniform at the molecular level; a homogeneous mixture containing particles so tiny that they cannot be seen even with a microscope.
* **solvent** The substance that dissolves a solute.
* **specific heat** - the amount of energy needed to raise the temperature of 1 kg of material 1 K; it is measured in joules per kilogram per kelvin.
* **spectral line** - a bright colored line in a spectroscope
* **spectroscope** - an instrument that separates light into a spectrum
* **spectroscopy** - a method of studying an object by examining the visible light and other electromagnetic waves it creates
* **spectrum** - the characteristic colors of light given off or absorbed by an element
* **speed** The rate of motion, or the rate at which a body changes position.
* **stable electron configuration-** arrangement of electrons in an atom/ion where each electron possesses the lowest possible energy
* **standard** In measurement, an exact quantity that everyone agrees to use as a basis of comparison.
* **state of matter** - Any of the four conditions in which matter can exist: solid, liquid, gas, or plasma.
* **static electricity** - The net buildup of electric charges on an object.
* **static friction** - the friction force that resists the motion between two surfaces that are not moving
* **steel** - an alloy of iron and carbon
* **step down transformer** - An electrical transformer that decreases the voltage of a power line.
* **step up transformer** - An electrical transformer that increases the voltage of a power line.
* **stoichiometry-** calculation of the quantities of chemical elements, molecules, or compounds involved in chemical reactions
* **strength** - the ability to maintain shape under the application of forces
* **strong acid** - An acid that ionizes almost completely in solution; for example, hydrochloric acid and sulfuric acid.
* **strong base** - A base that dissociates completely in solution; for example, sodium hydroxide.
* **strong nuclear force-** short-range attractive force that holds together the nucleus of the atom
* **subatomic particles-** particles that make up an atom
* **sublimation** The process in which a solid changes directly to a vapor without forming a liquid.
* **subshell-** orbitals of various shapes and energies within an energy level; which are s,p,d,f
* **substance** Matter that is an element or a compound.
* **substituted hydrocarbon** - A hydrocarbon in which one or more hydrogen atoms have been replaced by atoms of other elements.
* **super giant** - very large, bright star, that may be blue or red depending on its temperature
* **supercollider** A device to make protons collide at high speed so they break apart into quarks.  
  that has no electrical resistance; a current can flow indefinitely through a superconductor without losing energy.
* **supernova** - the explosion of a very large star
* **supersaturated solution** - An unstable solution that contains more solute that a saturated solution can at that same specific temperature.
* **suspension** A heterogeneous mixture containing a liquid in which larger particles eventually settle out.
* **synthesis reactions-** chemical reaction in which a single compound is created from two or more reactants (A + B 🡪 AB)
* **synthetic fiber** - A thin strand of synthetic polymer that can be woven into fabrics; examples include nylon and Kevlar fibers.
* **system** - a small group of related things that work together

**T**

* **technology** The practical use of scientific information to improve the quality of human life.
* **telephoto lens** - A lens having a long focal length and producing an enlarged, close-up image of an object.
* **temperature-** measure of the average kinetic energy of the particles within a substance
* **tension** - a pulling force that acts in a rope, string, or other object
* **terminal velocity** - The greatest velocity reached by a falling object. It is achieved when the force of gravity is balanced by air resistance.
* **terrestrial planets** - Mercury, Venus, Earth, Mars
* **testable hypothesis-** tentative explanation for an observation, phenomenon, or scientific problem that can be supported or refuted by further investigation the number of wavelengths that pass any fixed point per second, often expressed in hertz
* **theory** - a scientific explanation supported by much evidence collected over a long period of time
* **thermal conductor** - a material that allows heat to flow easily
* **thermal energy** - total energy of a material's particles, including both kinetic energy and potential energy.
* thermal equilibrium - a condition where temperatures are the same and no heat flows
* **thermal expansion** - a characteristic of almost all material that causes it to expand when heated and contract when cooled.
* **thermal pollution** - pollution caused when waste heat raises the temperature of the environment. In bodies of water, it can damage or destroy plants and animals that live there.
* **thermometer** - an instrument used to measure temperature
* **thermonuclear fusion** - Nuclear fusion that occurs under conditions of enormous heat, as in a star.
* **tidal energy** - Energy produced by the rise and fall of ocean levels; used to generate electricity.
* **time** The interval between two events.
* **titration** Process in which a solution of known concentration is used to determine the concentration of an acidic or basic solution.
* **torque-** force or system of forces tending to cause rotation
* **total internal reflection -** Occurs when all the light striking a surface between two materials is reflected totally back into the first material.
* **toxic** Hazardous substance that can injure living tissue.
* **tracer** A radioisotope used in medical diagnosis to allow doctors to monitor human body functions, locate tumors, detect fluid movement, and so on.
* **transformer** A device that can increase or decrease the voltage of an alternating current.
* **transistor** A semiconductor that amplifies or strengthens an electrical signal or acts as a tiny off/on switch.
* **transition element** - An element in Groups 3-12 of the periodic table; typically, these are metals with one or two electrons in their outer energy level.
* **translucent materials** - Materials that can be hazily seen through because they allow some light to pass through them, but not enough for a clear image.
* **transmutation-** Changing one element to another through radioactive decay.
* **transparent materials** - Materials that can be clearly seen through because they allow light to pass through them.
* **transuranium element** - Any element having more than 92 protons, the atomic number of uranium.
* **transverse wave** - A type of wave where the medium moves at right angles to the direction the wave is traveling.
* **trough** - the lowest point of a wave.
* **Tyndall effect** - The scattering of light by particles in a mixture; this effect can be seen in all colloids.

**U**

* **ultrasonic technology** - Technology using high-frequency sound waves for many different purposes such as medical diagnoses, sonar, and jewelry cleaning.
* **ultraviolet radiation** - Electromagnetic waves that have a higher frequency than visible light.
* **unbalanced forces** - the result in a net force on an object that can cause changes in motion
* **unsaturated fat** - a fat molecule that has less hydrogen atoms than a saturated fat
* **unsaturated hydrocarbons** - Hydrocarbons that contain at least one double or triple bond between carbon atoms.
* **unsaturated solution** - A solution that is capable of dissolving more solute at a specific temperature.

**V**

* **valence electrons** - electrons in the highest unfilled energy level of an atom; participate in chemical bonds
* **Value** - particular number with units or choice that a variable may have
* **Variable** - a quantity that can be precisely specified often with a numerical value
* **vector-** quantity that has both a magnitude and a direction
* Velocity - speed with direction
* **Venturi effect** - reduction in pressure of a fluid resulting from the speed increase as fluids are forced to flow faster through narrow spaces.
* **virtual image** - An image formed of diverging light rays, as in a plane or convex mirror, or seen through a concave lens.
* **visible radiation** - Electromagnetic waves in the only part of the electromagnetic spectrum we can see--light.
* **volt** - the unit for measuring electrical potential energy.
* **voltage** - a difference in electrical potential, measured in volts with a voltmeter.
* **voltmeter** -a galvanometer that measures potential differences in volts and is placed in parallel across a part of the circuit.
* **Volume-** the amount of space occupied by an object.

**W**

* **wave** -A rhythmic disturbance that carries energy through matter or space.
* **wavelength -** distance between two identical points on successive waves, i.e. crest-to-crest or trough-to-trough
* **weak acid** - An acid that partially ionizes in solution; for example, carbonic acid.
* **weak base** - A base that partially dissociates in solution; for example, magnesium hydroxide.
* **weak nuclear force-** an interaction between elementary particles involving neutrinos or antineutrinos that is responsible for certain kinds of radioactive decay
* **Wedge-** A simple machine consisting of a moving inclined plane with one or two sloping sides; examples are knives and chisels.
* **weight -**The measure of the force of gravity of an object.
* **wet cell** - A power source that generates electric current by a chemical reaction using a liquid electrolyte.
* **wheel and axle** - A simple machine consisting of two different-sized wheels that rotate together, such as a doorknob.
* **white dwarf** - a small star with high temperature and low brightness
* **wide angle lens** - A lens with a short focal length that produces a relatively small image of an object, but includes much of the object's surroundings.
* **work-** force times the distance through which it acts (in linear systems, W = F)

**X**

* **X rays** - Electromagnetic waves having a wavelength shorter than ultraviolet radiation; often used in medical diagnosis and photography because