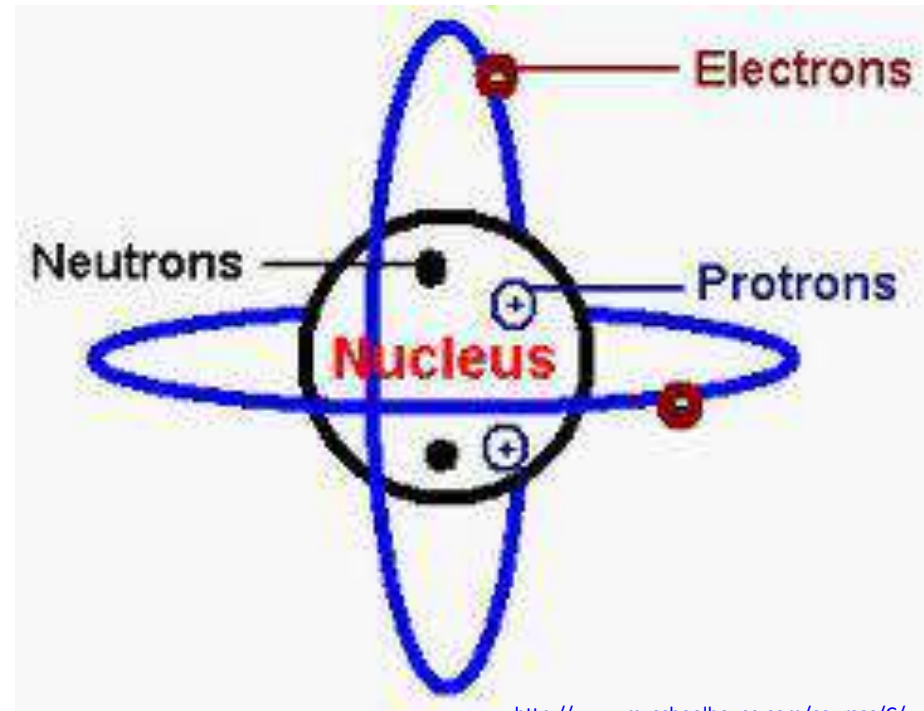
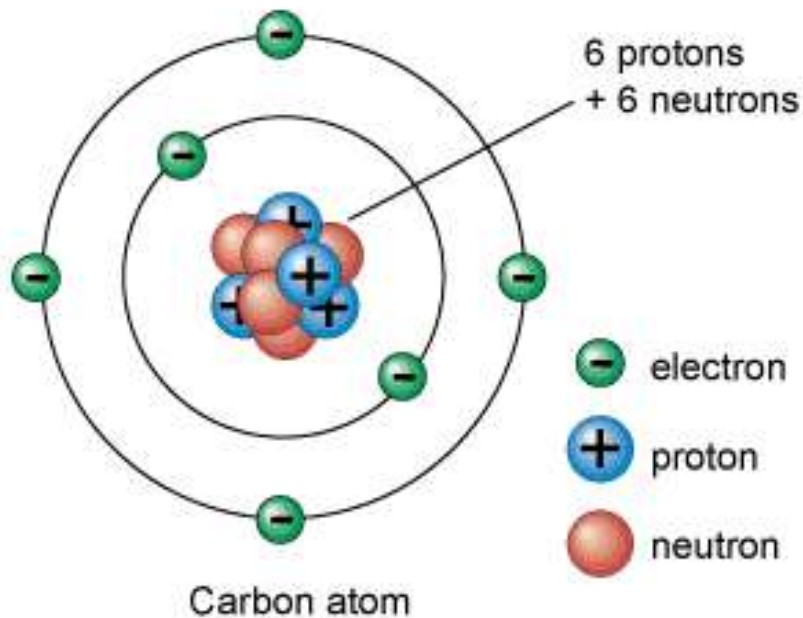


Introduction to Matter Unit Vocabulary

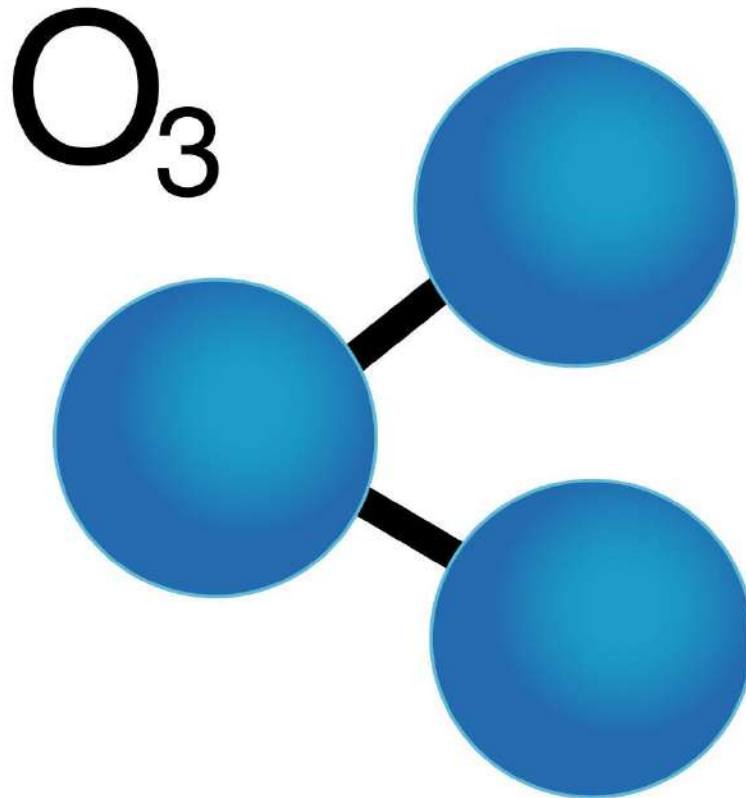
1. Atoms

The smallest unit of an element that maintains the properties of that element.



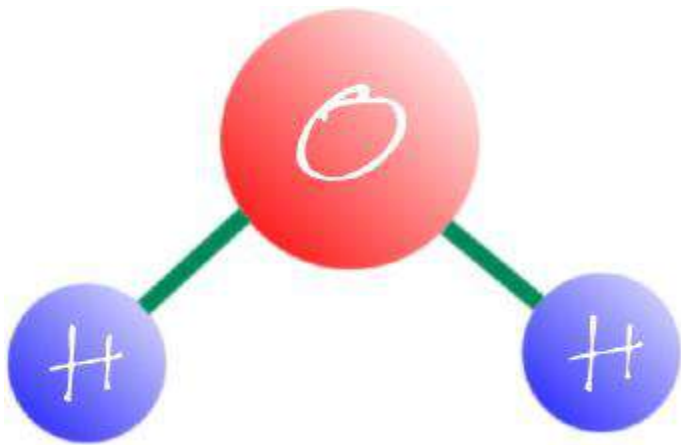
2. Molecule

The smallest unit of a substance that keeps all of the physical and chemical properties of that substance.



3. Chemical compound

- A chemical substance consisting of two or more different chemically bonded chemical elements.



Common Chemical Compounds

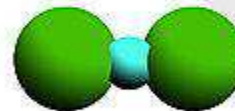
Water



Ammonia



Carbon Dioxide



Hydrogen Peroxide



4. Element

- A substance that cannot be separated or broken down into simpler substances by chemical means.

Periodic Table of the Elements																		18
1 1IA 11A																	VIII 8A	
1 H Hydrogen 1.0079	2 IIA 2A											13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	2 He Helium 4.0026	
3 Li Lithium 6.941	4 Be Beryllium 9.01218											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.00674	8 O Oxygen 15.9994	9 F Fluorine 18.998403	10 Ne Neon 20.1797	
11 Na Sodium 22.989769	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 9	10 VIII 10	11 IB 1B	12 IIB 2B	13 Al Aluminum 26.981538	14 Si Silicon 28.0855	15 P Phosphorus 30.973762	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948	
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.05591	22 Ti Titanium 47.88	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938	26 Fe Iron 55.847	27 Co Cobalt 58.9332	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.64	33 As Arsenic 74.92159	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80	
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium 98.9062	44 Ru Ruthenium 98.9062	45 Rh Rhodium 102.9055	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.90447	54 Xe Xenon 131.29	
55 Cs Cesium 132.90545	56 Ba Barium 137.327	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 186.222	78 Pt Platinum 195.08	79 Au Gold 196.9665	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98037	84 Po Polonium [209]	85 At Astatine [209]	86 Rn Radon 222.0176	
87 Fr Francium 223.017	88 Ra Radium 226.0254	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [277]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [271]	111 Rg Roentgenium [272]	112 Cn Copernicium [285]	113 Nh Nihonium [284]	114 Fl Flerovium [289]	115 Mc Moscovium [288]	116 Lv Livermorium [293]	117 Ts Tennessine [294]	118 Og Oganesson [294]	
57 La Lanthanum 138.9055	58 Ce Cerium 140.115	59 Pr Praseodymium 140.90768	60 Nd Neodymium 144.24	61 Pm Promethium 144.9127	62 Sm Samarium 150.36	63 Eu Europium 151.9655	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92534	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93032	68 Er Erbium 167.26	69 Tm Thulium 168.93421	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967				
89 Ac Actinium 227.02781	90 Th Thorium 232.0377	91 Pa Protactinium 231.03689	92 U Uranium 238.02891	93 Np Neptunium 237.04817	94 Pu Plutonium 244.0642	95 Am Americium 243.0614	96 Cm Curium 247.0754	97 Bk Berkelium 247.0713	98 Cf Californium 251.0788	99 Es Einsteinium [252]	100 Fm Fermium [257]	101 Md Mendelevium [258]	102 No Nobelium [259]	103 Lr Lawrencium [260]				
Alkali Metal	Alkaline Earth	Transition Metal	Basic Metal	Semimetals	Nonmetals	Halogens	Noble Gas	Lanthanides	Actinides									

5. Chemical energy

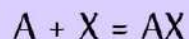
- Energy released by a chemical reaction or absorbed in the formation of a compound.



6. Chemical reaction

- The process by which one or more substances change to produce one or more different substances.

Synthesis Reactions



two or more substances combine to form a new compound

Examples

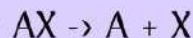
$4Fe + 3O_2 \rightarrow 2Fe_2O_3$
Iron and oxygen react and form iron(III) oxide or when iron rusts



Salt
 $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$
Sodium and Chlorine react to form sodium chloride



Decomposition Reactions



when a single compound undergoes a reaction that produces 2 or more simpler substances

Examples

Mercury(II)oxide is heated it yields oxygen and metallic mercury
 $2HgO(s) + \text{heat} \rightarrow 2Hg(l) + O_2(g)$



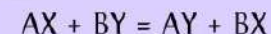
the chemical reaction in fireworks
reaction of perchlorates
 $KClO_4 \rightarrow KCl + 2O_2$



Types of Chemical Reactions

Karla Hageman

Double-Displacement Reactions



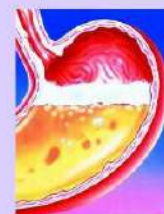
when the ions of two compounds exchange places in an aqueous solution to form new compounds

Examples

Silver nitrate combines with sodium chloride to yield silver chloride and sodium nitrate
 $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

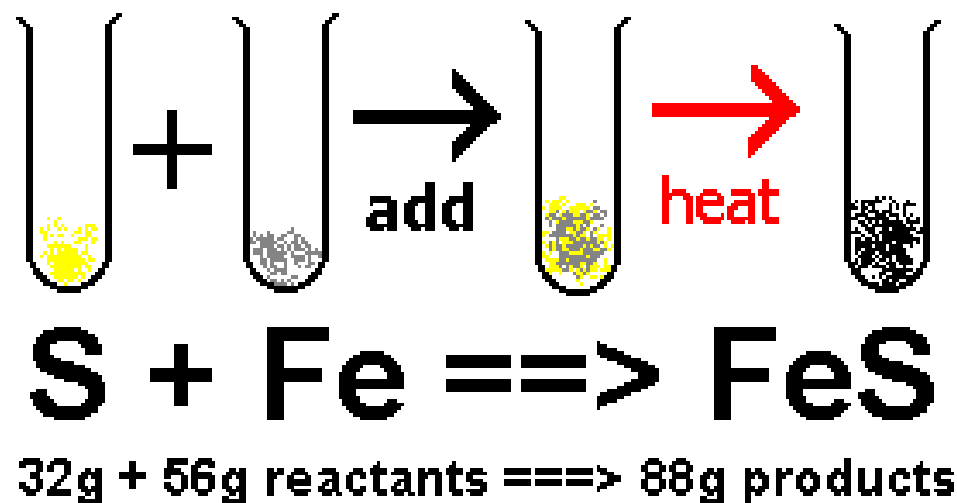


The neutralization of stomach acid
 $HCl + NaHCO_3 \rightarrow NaCl + H_2CO_3$



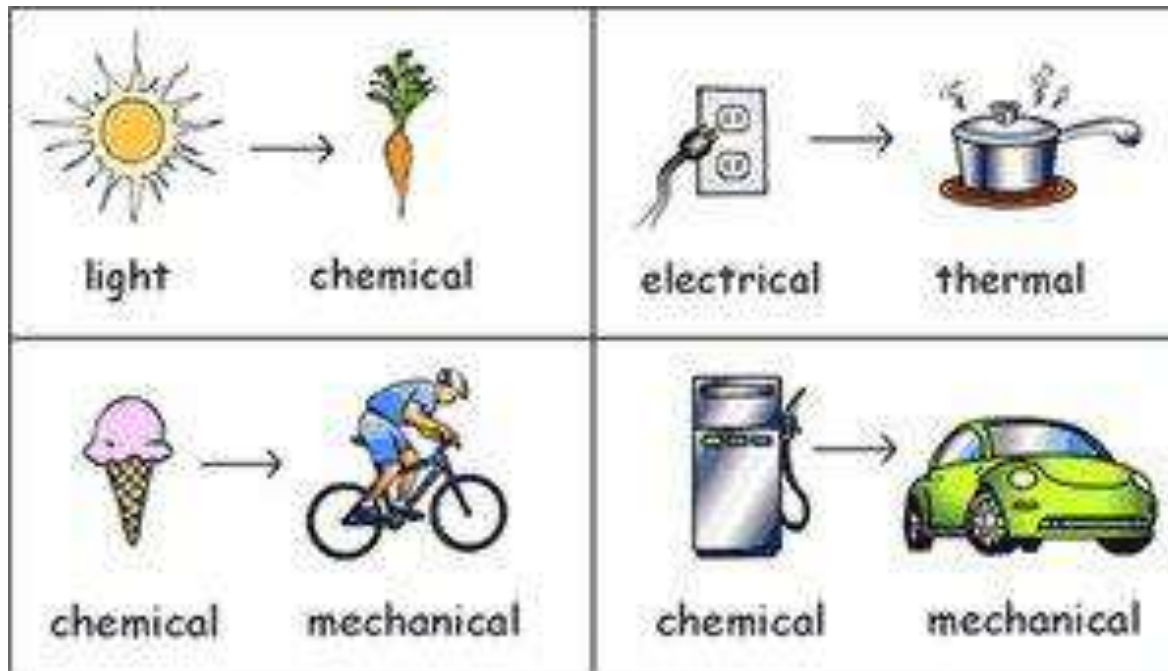
7. Law of Conservation of Matter

- Law that states that matter cannot be created or destroyed in an isolated system.



8. Law of Conservation of Energy

- Law that states that energy cannot be created or destroyed but can be changed from one form to another.



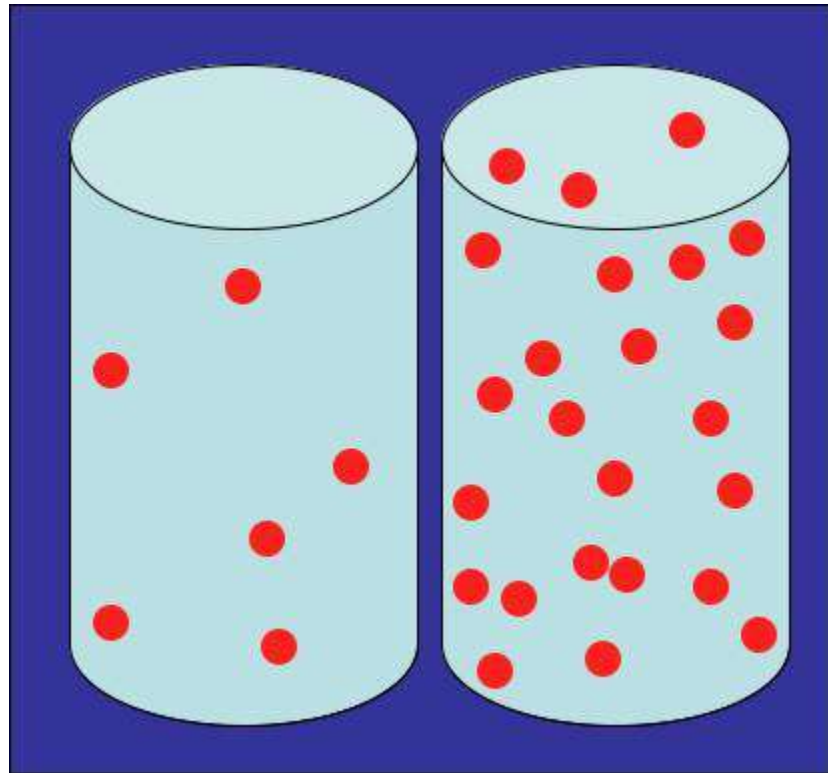
9. pH

- A value that is used to express the acidity or basicity (alkalinity) of a system.

Concentration of Hydrogen ions compared to distilled water		Examples of solutions at this pH
10,000,000	pH = 0	Battery acid, Strong Hydrofluoric Acid
1,000,000	pH = 1	Hydrochloric acid secreted by stomach lining
100,000	pH = 2	Lemon Juice, Gastric Acid Vinegar
10,000	pH = 3	Grapefruit, Orange Juice, Soda
1,000	pH = 4	Tomato Juice Acid rain
100	pH = 5	Soft drinking water Black Coffee
10	pH = 6	Urine Saliva
1	pH = 7	"Pure" water
1/10	pH = 8	Sea water
1/100	pH = 9	Baking soda
1/1,000	pH = 10	Great Salt Lake Milk of Magnesia
1/10,000	pH = 11	Ammonia solution
1/100,000	pH = 12	Soapy water
1/1,000,000	pH = 13	Bleaches Oven cleaner
1/10,000,000	pH = 14	Liquid drain cleaner

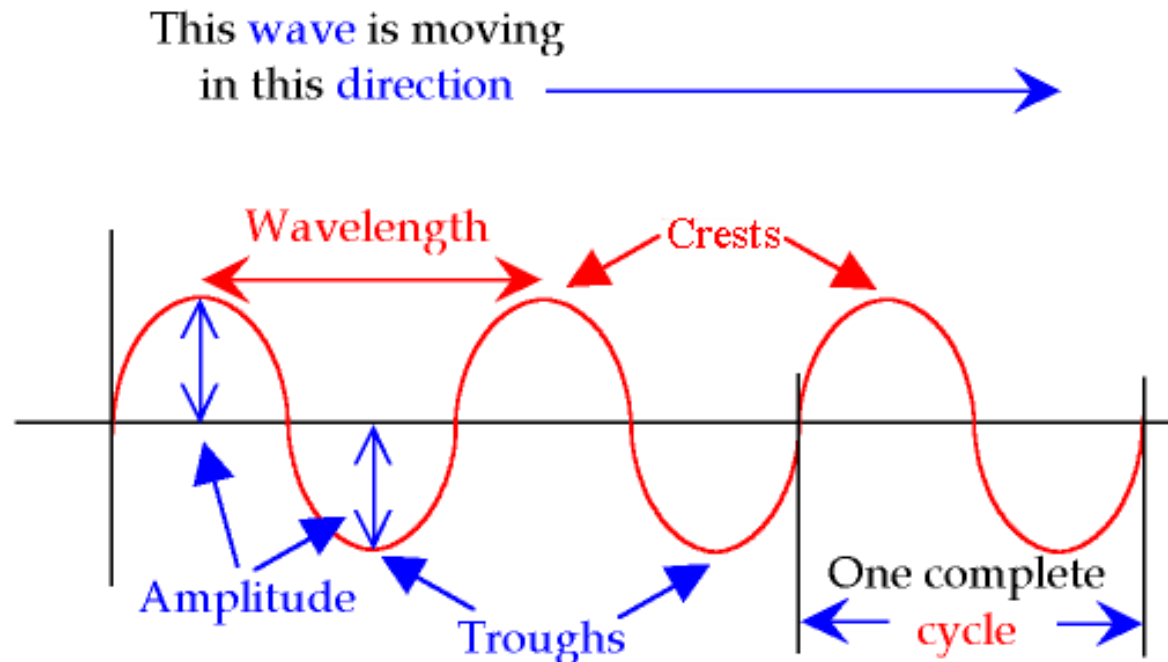
10. Density

- The ratio of the mass of a substance to the volume of the substance.



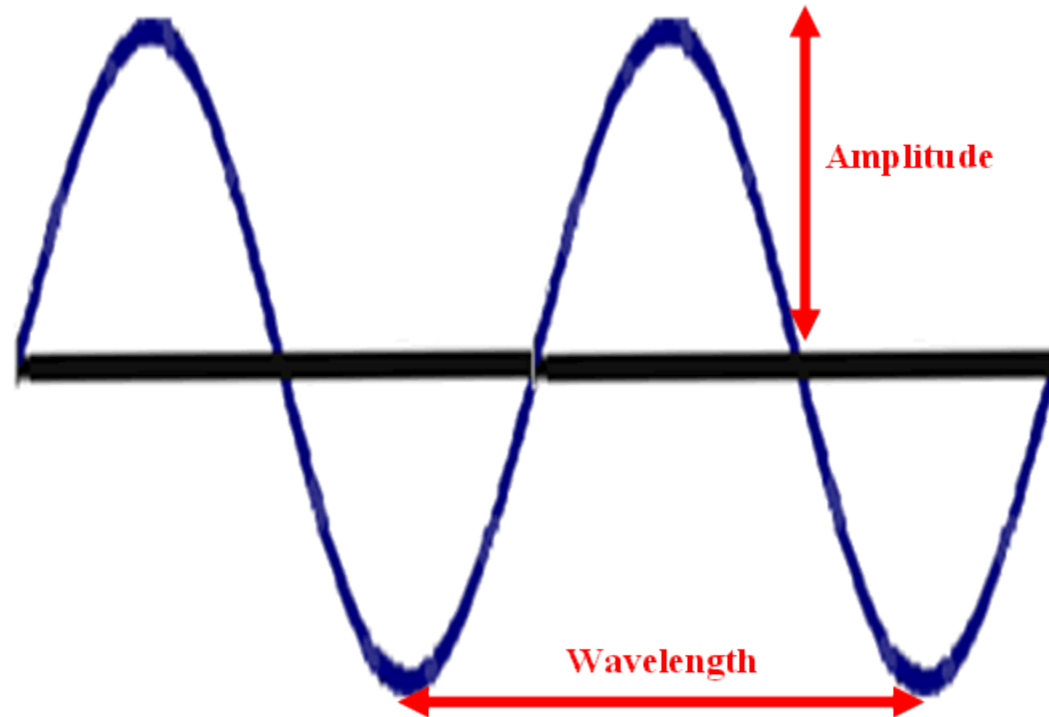
11. Wave

- A periodic disturbance in a solid, liquid, or gas as energy is transmitted through a medium



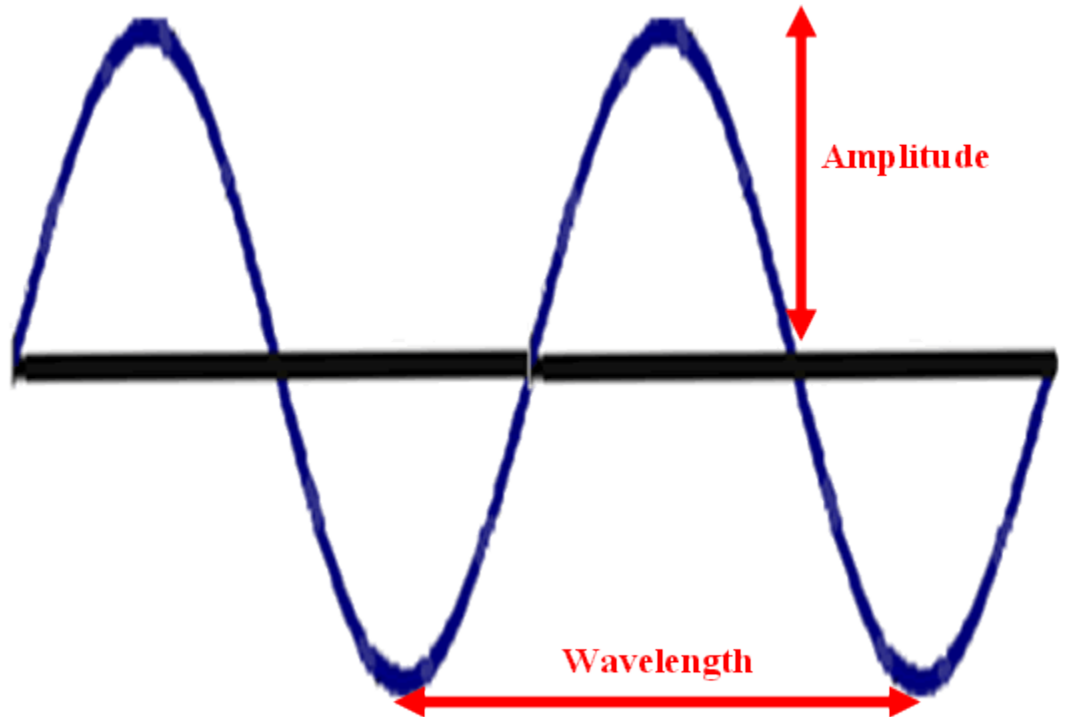
12. Amplitude

- The maximum distance that the particles of a wave's medium vibrate from their rest position



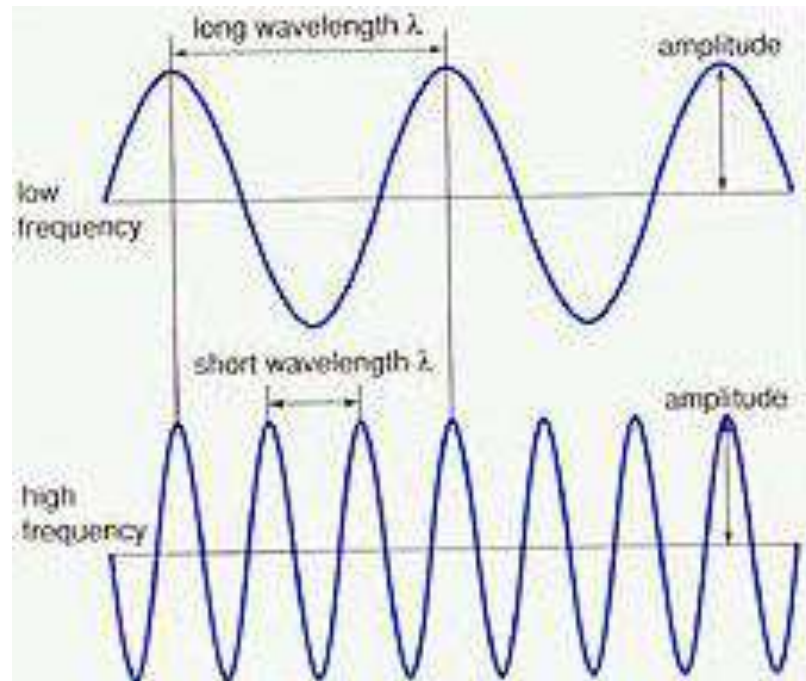
13. Wavelength

- The distance from any point on a wave to an identical point on the next wave.



14. Frequency

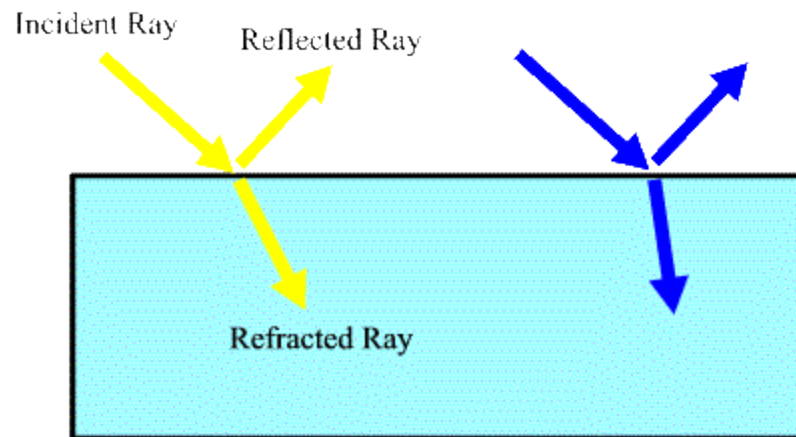
- The number of waves produced in a given amount of time.



15. Refraction

- The bending of a wave as the wave passes between two substances in which the speed of the wave differs.

Reflection and Refraction from a planar surface



16. Reflection

- The bouncing back of a ray of light, sound, or heat when the ray hits a surface that it does not go through.

Reflection and Refraction from a planar surface

