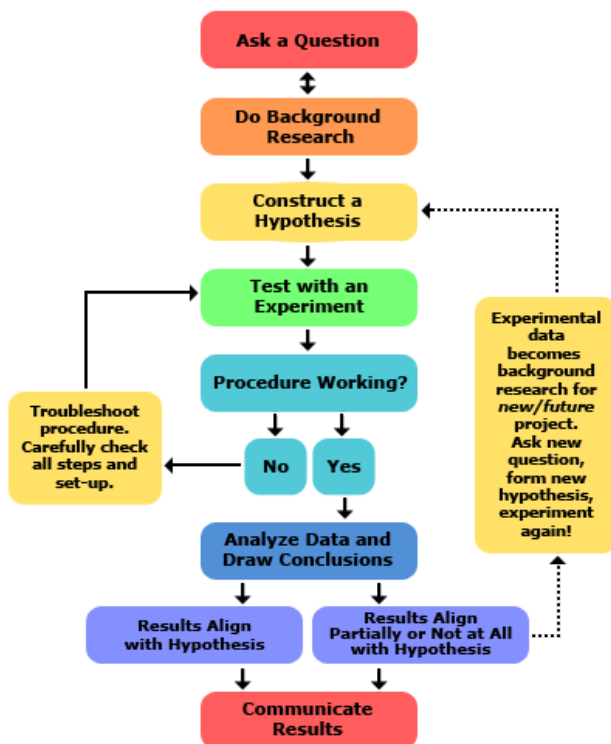
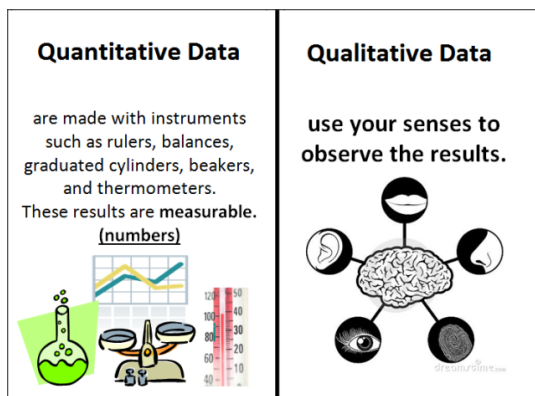
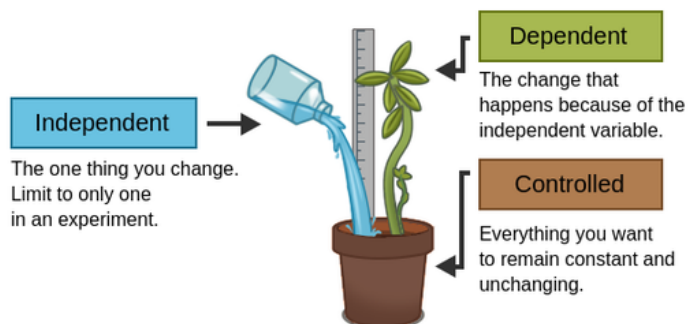


Chemistry: Unit 1 Notes (Ch. 1-3)



Types of variables :



Chapter 2 Notes: Analyzing Data

_____ : a defined unit in a system of measurement that is based on an object or event in the physical world.

SI Base Units

Quantity	Base Unit	Based on what?
	Second (s)	Frequency of radiation given off by a cesium-133 atom
	Meter (m)	Distance that light travels in a vacuum in $1/299,792,458$ of a second
	Kilogram (kg)	A platinum and iridium cylinder kept in France stored in a vacuum under a triple bell jar
	Kelvin (K)	Fahrenheit scale- water freezes at 32 degrees and boils at 212 degrees Celsius scale: Freezing point 0 degrees, boiling point 100 degrees Zero Kelvin is where all particles are in lowest possible energy state, water freezes at 272.15 K and boils at 373.15 K $K = C + 273$
Amount of a substance	Mole (mol)	
Electric current	Ampere (A)	
Luminous intensity	Candela (cd)	

Derived Units

a unit that is defined by a combination of _____

Quantity	Derived Unit
Volume - space occupied by an object	m^3 or L
Density - physical property of matter that is amount of mass per unit volume	g/cm^3 Density = mass/volume

Scientific Notation

can be used to express any number as a number between 1 and 10 (known as the coefficient) multiplied by _____ raised to a power (known as the exponent)

Number	Scientific Notation
460,000,000,000,000,000,000	4.6×10^{23}
0.000000000000000000002	2×10^{-23}

Analyzing Data

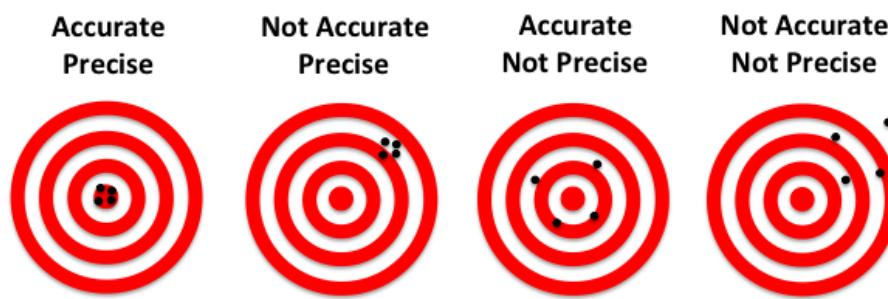
_____ - how close a measured value is to an accepted value

_____ - difference between an experimental value and an accepted value

Error = experimental value - accepted value

_____ = error/accepted value $\times 100$

_____ - how close a series of measurements are to one another



Significant Figures

all known digits plus one estimated digit

Rules	Example
1. Nonzero numbers are always significant	72.3 g has 3
2. All final zeros to the right of the decimal are significant	6.20 g has 3
3. Any zero between significant figures is significant	60.5 g has 3
4. Placeholder zeroes are not significant. To remove placeholder zeros, rewrite the number in scientific notation	0.0253 g and 4320 g (each has 3)
5. Counting numbers and defined constants have infinite number of significant figures	6 molecules

Rounding Numbers

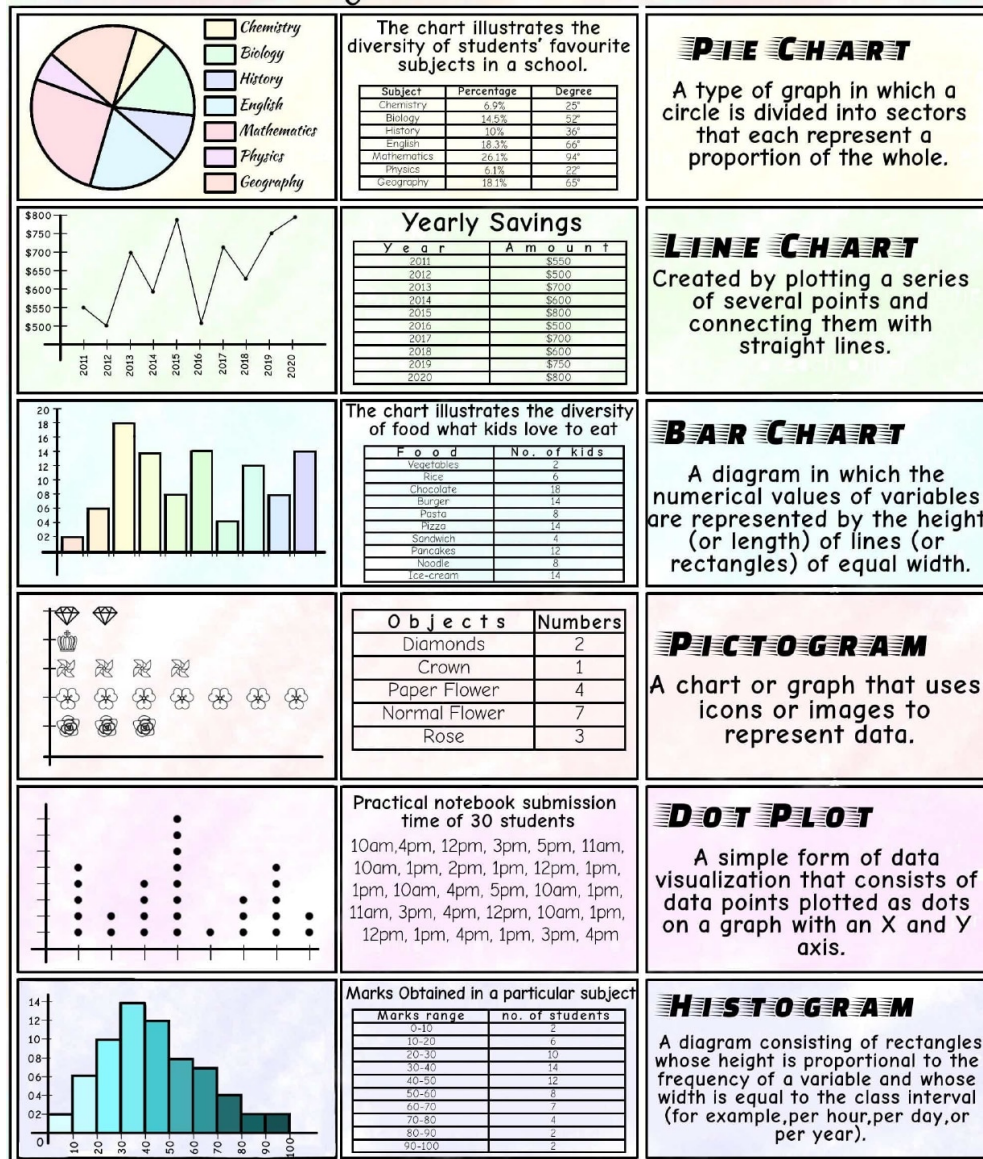
Rules	Example
1. If the digit to the right of the last significant figure is less than 5, do not change the last significant figure	2.532 → 2.53
2. If the digit to the right of the last significant figure is greater than 5, round up the last significant figure	2.536 → 2.54
3. If the digits to the right of the last significant figure are a 5 followed by a nonzero digit, round up the last significant figure	2.5351 → 2.54

Graphs

visual display of data

*Special Note: _____ for line graph = rise/run or change in y/change in x

Types of Graphs



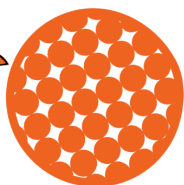
Chapter 3: Matter- Properties and Change

Three States of Matter



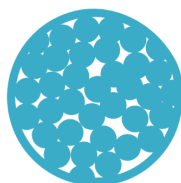
Solid

- Particles in a solid are tightly packaged usually in a regular pattern.
- Particles in a solid will vibrate but cannot move past each other.
- Solids retain their shapes.



Liquid

- Particles in a liquid are close together with no regular pattern.
- Particles in a liquid flow and can easily move or slide past one another.
- Liquids assume the shape of their containers.



Gas

- Particles in a gas are well separated with no regular pattern.
- Particles in a gas vibrate freely at high speeds.
- Gases assume the shapes of their containers.



Vapor: gas state of substance that is solid or liquid @ room temp

Properties of Matter

Physical Properties

Observed and measured without changing chemical identity of sample



Color



Length



Volume



Opacity

Chemical Properties

Observed and measured as sample changes chemical identity



Acidity



Reactivity



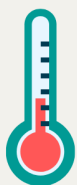
Flammability



Toxicity

Intensive and Extensive Properties

Intensive properties do not depend on the amount of matter in a sample.



Temperature



Boiling Point



Concentration

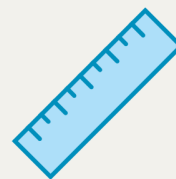


Luster

Extensive properties depend on how much matter a sample contains.



Weight



Length



Volume



Entropy

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Chemical and Physical Changes

Chemical change: A chemical reaction forms new products.



Combustion



Rotting



Rusting



Digestion

Physical change: Matter changes form but not chemical identity.



Melting



Shredding



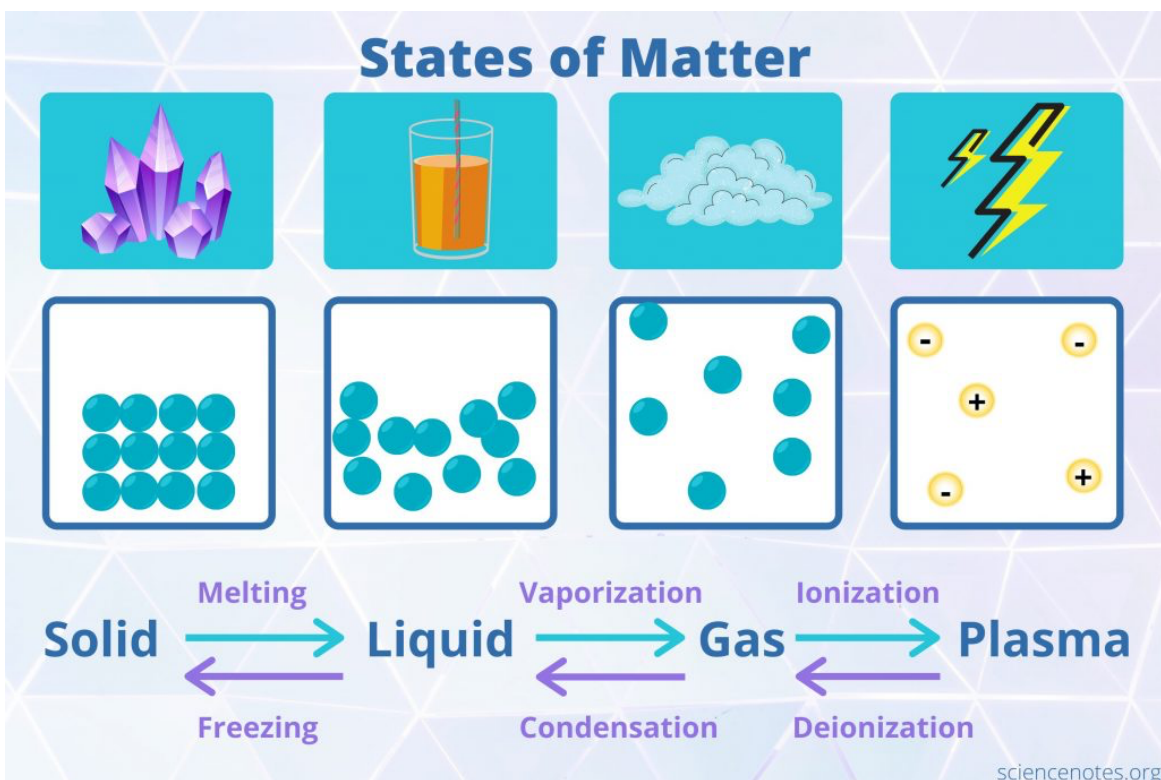
Boiling



Chopping

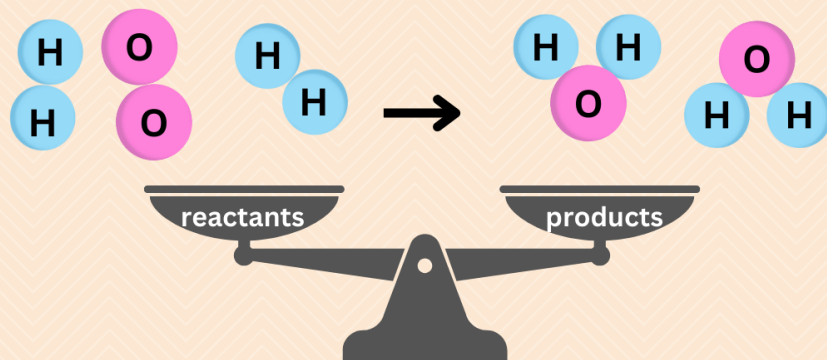
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Phase Change



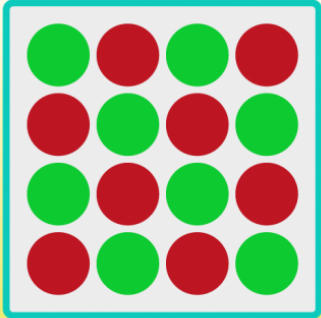
Law of Conservation of Mass

Matter is neither created nor destroyed by chemical reactions or physical changes.



- The mass of the system is the same before and after the reaction.
- The number and type of atoms does not change.

HOMOGENEOUS MIXTURE



UNIFORM DISTRIBUTION of PARTICLES


AIR


STEEL


WINE


RAIN

HETEROGENEOUS MIXTURE



NON-UNIFORM DISTRIBUTION of PARTICLES


ICE WATER


CEREAL IN MILK


SOIL


OIL AND VINEGAR

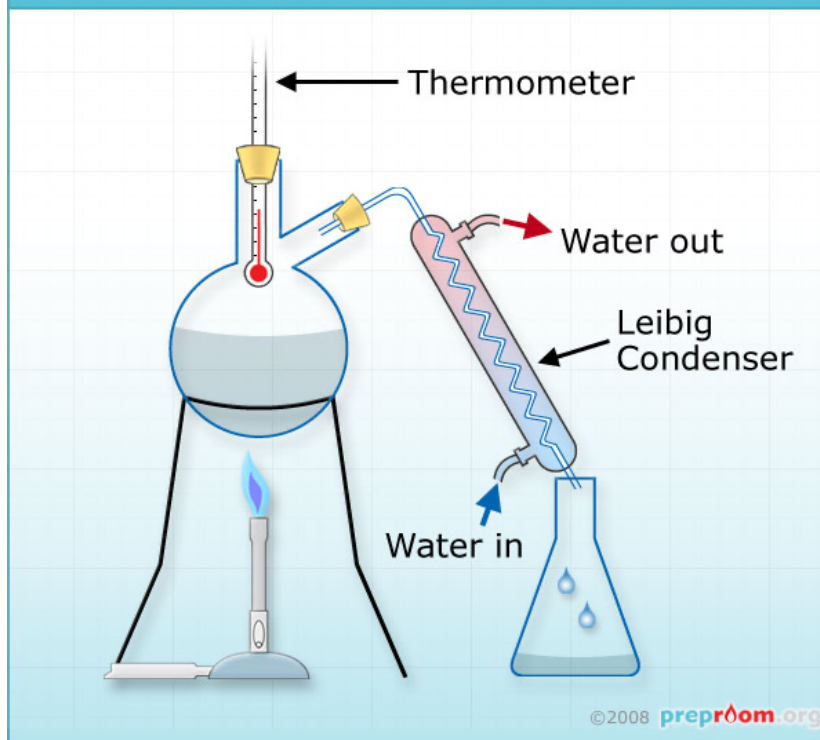
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What Is Filtration?

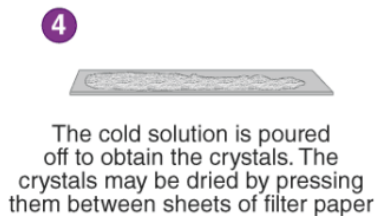
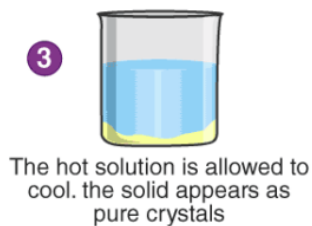
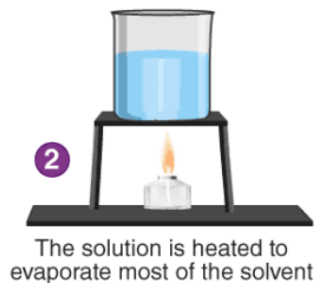
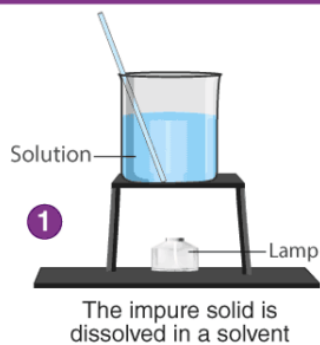
Filtration is a process that separates solid particles from a liquid or gas by passing the mixture through a filter.

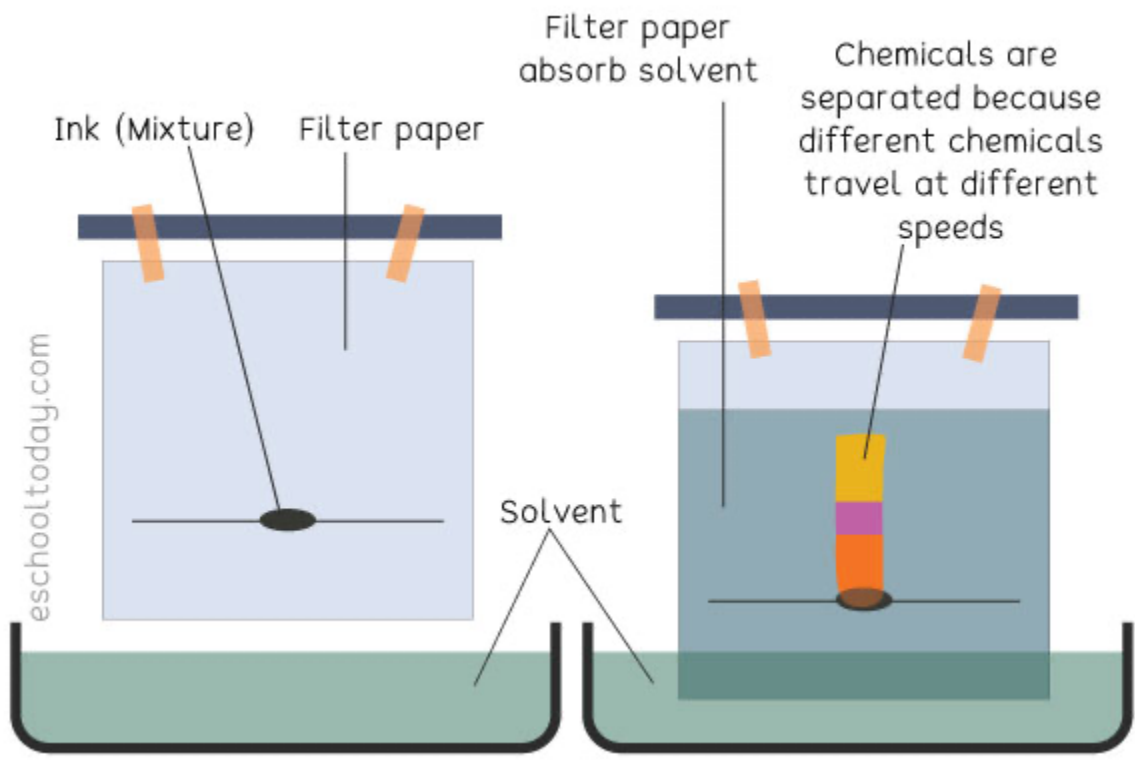
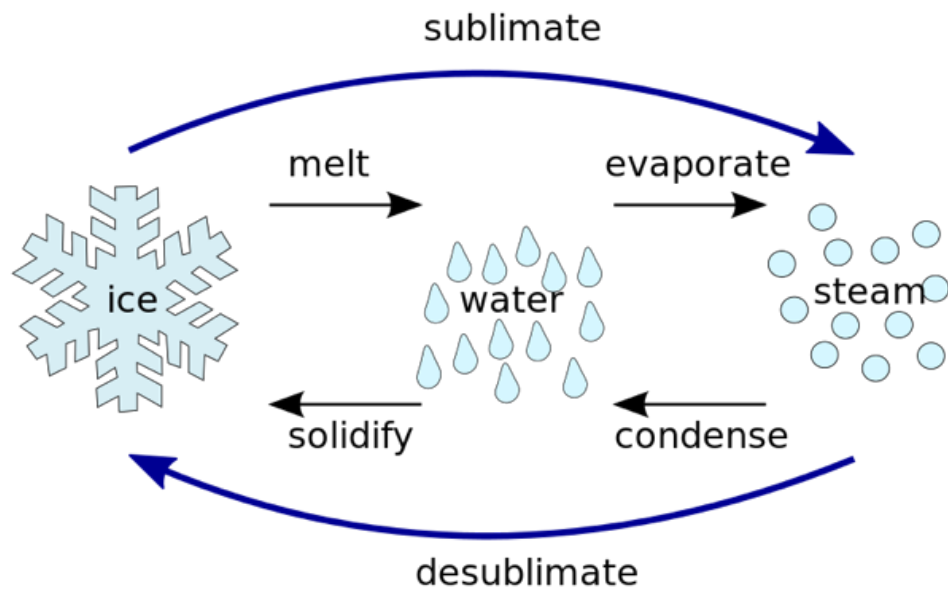


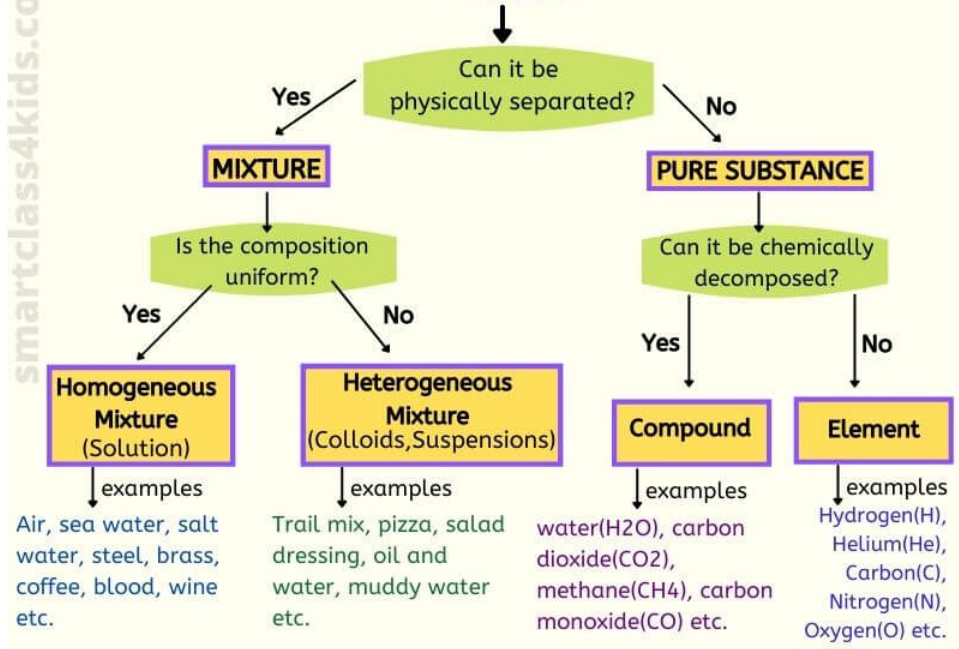
Simple Distillation



CRYSTALLIZATION PROCESS







Mendeleev's Periodic Table

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This is Dmitri Mendeleev's original 1869 periodic table.

Title translates: "An experiment on a system of elements based on their atomic weights and chemical similarities."



typed

ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ,

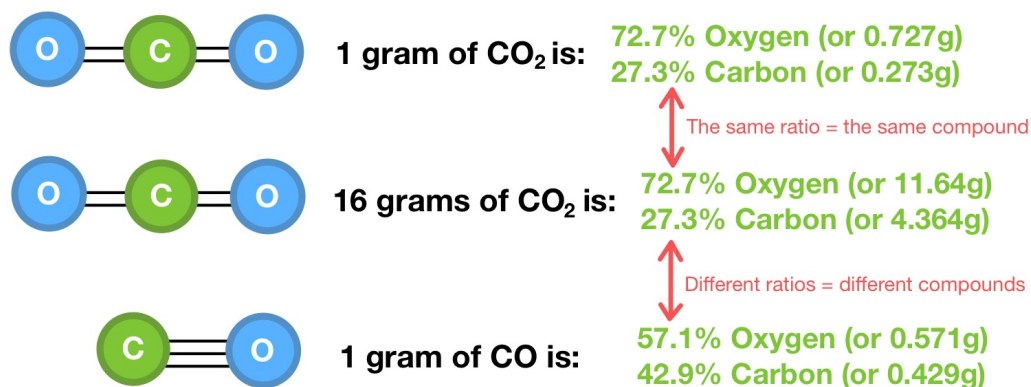
ОСНОВАННОЙ НА ИХЪ АТОМНОМЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

			Ti=50	Zr= 90	?=180.
			V=51	Nb= 94	Ta=182.
			Cr=52	Mo= 96	W=186.
			Mn=55	Rh=104.4,	Pt=197.1.
			Fe=56	Ru=104.4,	Ir=198.
			Ni=58.5	Pd=106.5,	Os=199.
H=1			C=63.4	Ag=108	Hg=200.
	Be= 9.4	Mg=24	Zn=65.2	Cd=112	
	B=11	Al=27.3	?=68	U=116	Au=197?
	C=12	Si=28	?=70	Sn=118	
	N=14	P=31	As=75	Sb=122	Bi=210?
	O=16	S=32	Se=78.4	Te=128	
	F=19	Cl=35.5	Br=80	I=127	
Li=7	Na=23	K=39	Rb=85.4	Cs=133	Tl=204.
		Ca=40	Sr=87.6	Ba=137	Pb=207.
		?=45	Ce=92		
		?Er=56	La=94		
		?Yt=60	Di=95		
		?=75.6	Th=118?		

Д. Менделѣвъ

Dmitri Mendeleev's periodic table is the forerunner to the modern periodic table. It is a “periodic” table because it groups elements in rows and columns that showcase recurring properties, such as valence, electronegativity, and ionization energy.

Visualizing Proust's Law of Definite Proportions



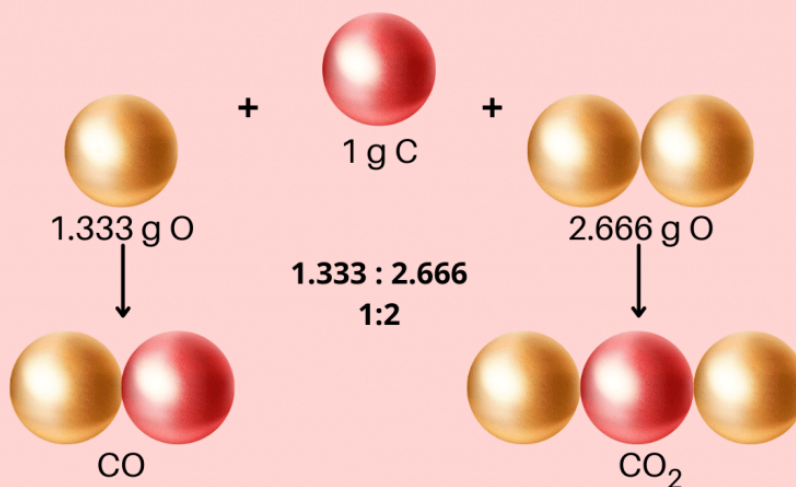
Mass of Compound = sum of masses of elements

Percent by Mass = ratio of the mass of each element to the total mass of compound expressed as percentage

% mass = mass of element/mass of compound x 100

Law of Multiple Proportions

When two elements combine to form more than one compound, the different masses of the element that combines with a fixed mass of the other element are a ratio of small whole numbers.



Modeling Problem Solving

Density

Scientific Notation

Homework 1 Tips

Percent Error

Significant Figures
& Rounding

Homework 2 Tips

Law of Definite Proportions

Law of Multiple Proportions