$= 22.4 L = 6.022 * 10^{23} molecules$ 

Standard number 6.023x 10<sup>23</sup> is called Avogadro number in honour of Avogadro (he did not give this number) and is denoted by  $N_A$ .

The volume occupied by one mole molecules of a gaseous substance is called molar volume or gram molecular volume.

Number of moles = amount of substance (in gram) / molar mass



Number of molecules in Ig compound =  $N_A$  / g-molar mass

Number of molecules in  $1 \text{ cm}^3$  (1 mL) of an ideal gas at STP is called Loschmidt number (2.69x  $10^{19}$ ).

[One amu or u (unified mass) is equal to exactly the 1 / 12th of the mass of <sup>12</sup>C atom, i.e., 1 amu or u = 1 / 1212 \* mass of one carbon (C<sup>12</sup>) atom

 $1 \text{ amu} = 1 / N_A$ 

= 1 Dalton = 1.66x 10<sup>-24</sup> g

One mole of electrons weighs  $0.55 \text{ mg} (5.5 \text{ x} 10^{-4} \text{ g})$ .

# **Atomic Mass**

It is the average relative atomic mass of an atom. It indicates that how many times an atom of that element http://schools.aglasem.com/53610

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is heavier as compared with 1 / 12 of the mass of an atom of carbon-12.

Average atomic mass = average mass of an atom / 1 / 12 \* mass of an atom of C<sup>12</sup>

The word average has been used in the above definition and is very significant because elements occur in nature as mixture of several isotopes. So. atomic mass can be computed as

Average atomic mass

= RA(1) \* at. mass(1) + RA(2) \* at. mass (2) / RA(I) + RA(2)

Here, RA is relative abundance of different isotopes.

In case of volatile chlorides. the atomic weight is calculated as

and valency = 2 \* vapour density of chloride / eq. wt. of metal Sale.co.uk According to Dulong and Petit's rule, from 13 of 18 Atomic weight specific heat = 6.4 Page

## Gram Atomic Mass (GAM)

Atomic mass of an element expressed in gram is called its gram atomic mass or gram-atom or mole-atom.

## **Molecular Mass**

It is the mass of a molecule, i.e., number of times a molecule is heavier than 1 / 12 th mass of C-12 atom. Molecular mass of a substance is an additive property and can be calculated by taking algebraic sum of atomic masses of all the atoms of different elements present in one molecule.

Molecular Mass = average relative mass of one molecule / 1 / 12 th \* mass of C-12 atom

[Gram molecular mass or molar mass is molecular mass of a substance expressed in gram.

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Molecular mass = 2 * V D ]
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### **Equivalent Mass**

It is the mass of an element or a compound which would combine with or displace (by weight) 1 part of hydrogen or 8 parts of oxygen or 35.5 parts of chlorine

Eq. wt. of metal = wt. of metal / wt. of  $H_2$  displaced \* 1.008

= wt. of metal / volume of  $H_2$  (in mL) displaced at STP \* 11200

Eq. wt. of metal = wt. of metal / wt. of oxygen combined \* 8

= wt. of metal / wt. of chlorine combined \* 35.5

In general,

Eq. mass 0f a salt = formula mass / total positive or negative charge

Equivalent mass = atomic mass or Molecular mass / n factor

n factor for various compounds can be obtained as

(i) n factor for acids i.e., basicity

(Number of ionisable H<sup>+</sup> per molecule is the basicity of acid.)

Acid	HCI	H <sub>2</sub> SO <sub>4</sub>	H <sub>3</sub> PO <sub>3</sub>	H <sub>3</sub> PO <sub>4</sub>	H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>
Basicity	1	2	2	3	2

(ii) n factor for bases, i.e., acidity.