

### Mole

In the field of chemistry, a mole is defined as the amount of a substance that contains exactly  $6.02214076 \times 10^{23}$  'elementary entities' of the given substance.

### Number of Moles

$$\frac{\text{Number-of-Particles}}{6.02 \times 10^{23}} = \frac{\text{Given-Mass}}{\text{Molar-Mass}} = \frac{\text{Given-Volume-in-Litres}}{22.4 \text{ Litres}} = \text{Number-of-Moles}$$

### STP vs NTP

Properties	STP	NTP
Temperature (in Kelvin)	273.16 K $\approx$ 273 K	293.16K $\approx$ 293 K
Temperature (in Celsius)	0°C	20°C
Pressure	1 bar = 0.9862 atm $\approx$ 1 atm	1 atm
Pressure (in $\text{Nm}^2$ )	$10^5 \text{ Nm}^2$	$1.01 \times 10^5 \text{ Nm}^2$

K= Kelvin $\leftrightarrow$ (temperature)

°C= Degree Celsius $\leftrightarrow$ (temperature)

atm= atmosphere $\leftrightarrow$ (pressure)

$\text{Nm}^2$ = Newton\*(meter)<sup>2</sup> $\leftrightarrow$ (pressure)

### Percentage Composition of an Element

$$\frac{n \times (\text{Atomic-mass-of-element})}{\text{Molar-mass-of-compound}} \times 100$$

n= Number of atoms of the element in one molecule of the compound

### Temperature Conversions

$$^{\circ}\text{F} = (^{\circ}\text{C} \times \frac{9}{5}) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times \frac{5}{9}$$

$$^{\circ}\text{C} = (\text{K} - 273.15)$$

$$\text{K} = (^{\circ}\text{C} + 273.15)$$

°F= Degree Fahrenheit

°C= Degree Celsius

K= Degree Kelvin

### Laws of Chemistry

LAWS	SCIENTISTS	DATE
1. Law of Conservation of Mass	Antoine Lavoisier	1744
2. Law of Definite Composition/Proportions	Joseph Proust	1799
3. Law of Multiple Proportions	John Dalton	1804
4. Law of Gaseous volume	Gay Lussac	1808

### Conversions

#### Volume

1 Litre=  $10^3 \text{ mL} = 10^3 \text{ cm}^3 = 10^{-3} \text{ m}^3 = 1 \text{ dm}^3$

#### Pressure

1 atm= 76 cm of Hg= 760 mm of Hg= 760 torr

1 atm=  $1.01 \times 10^5 \text{ Nm}^2$

1 atm=  $1.01 \times 10^5 \text{ Pa}$

1 bar= 0.9862 atm  $\approx$  1 atm

mL= milli-litre

cm= centimeter

m= meter

dm= decimeter

atm= atmosphere

N= Newton

Pa= Pascals

# C

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