

The Hidden Mole



Moles are one of the most important units in chemistry. It is imperative that one be able to convert quickly and accurately to moles. The following table describes what information you need and what you need to do in order to convert to moles from different starting points.

Starting Unit	Substance	Mathematical Operation	Note
Mass	Solid, gas, liquid, solid in solution	$\frac{\text{mass}}{\text{molecular weight}} = \text{mols}$	Mass must be in grams
Vol. & density	Solid, gas, liquid	$\frac{(\text{Vol.})(\text{density})}{\text{molecular weight}} = \text{mols}$	Vol. unit and the density's vol. unit must cancel
Vol. & M	Solution	$(M)(\text{Vol.}) = \text{mols}$	Vol. must be in liters
P, V, & T	Gas	$\frac{PV}{RT} = n = \text{mols}$	P must be in atm, V must be in liters, T must be in Kelvin, and R = 0.082057 L·atm/K·mol

Note: Make sure you understand what volume you have. Is the volume of the pure substance or is it of a solution?