The Mole

- a unit of measure
- measures the amount of a substance

1 mole = 6.02×10^{23} particles (atoms if element) (molecules if covalent compound) (formula units if ionic compound)

Avogadro's number (N_A)

e.g. How many moles of peanuts are present in 5.56×10^{23} peanuts?

Conversion factor method:

to be converted with units x $\frac{\text{new units}}{\text{old units}}$ conversion factor (c.f.)

1 mole peanuts = 6.02×10^{23} peanuts (c.f.)

5.56×10^{23} peanuts x $\frac{1 \text{ mole peanuts}}{6.02 \times 10^{23} \text{ peanuts}}$ = 0.924 moles of peanuts

e.g. How many molecules of H_2O are present in 0.75 moles of H_2O?

c.f. 1 mole of H_2O = 6.02×10^{23} molecules of H_2O

0.75 moles of H_2O x $\frac{6.02 \times 10^{23} \text{ molecules of } H_2O}{1 \text{ mole } H_2O}$ = 4.5×10^{23} molecules of H_2O

e.g. How many moles of $CuSO_4$ are present in 2.9×10^{23} molecules of $CuSO_4$?

c.f. 1 mole of $CuSO_4$ = 6.02×10^{23} molecules of $CuSO_4$

2.9×10^{23} molecules of $CuSO_4$ x $\frac{1 \text{ mole } CuSO_4}{6.02 \times 10^{23} \text{ molecules } CuSO_4}$ = 0.48 mole $CuSO_4$