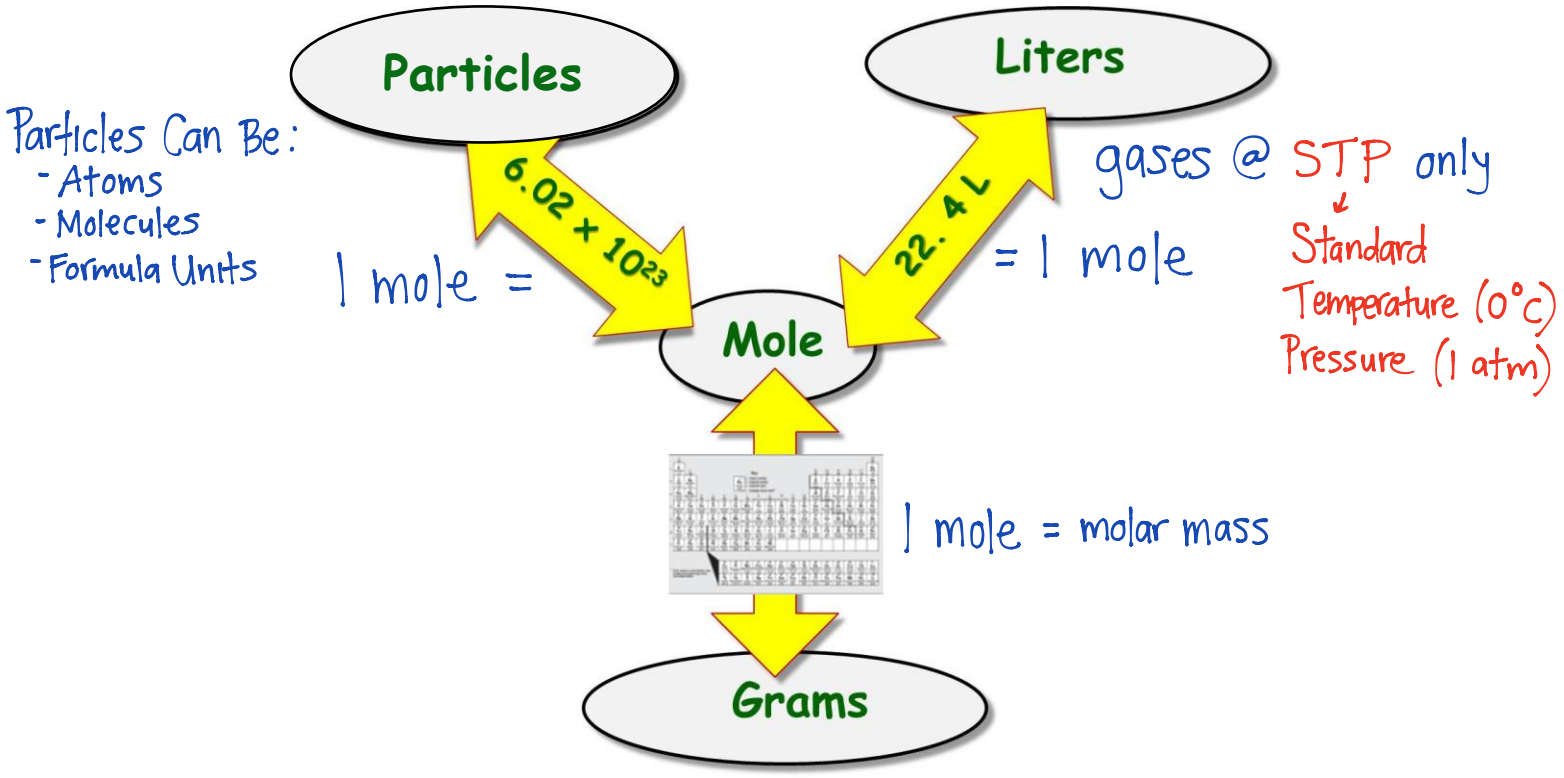
Mole Conversion Map

http://wongchemistry.weebly.com/the-mole.html



1. What is the mass, in grams, of 2.50 moles of methane, CH_4? (3 sig figs)

Map it: mol CH_4 (given) → (molar mass) → g CH_4 (want)

Solve it: $\frac{2.50 \text{ mol } CH_4}{1} \left| \frac{16.05 \text{ g } CH_4}{1 \text{ mol } CH_4} \right. = 40.125 =$ **40.1 g CH_4** (3 SF's ✓)

2. How many moles of helium atoms are in 16 grams of helium? (2 SF's)

Map it: g He (given) → (molar mass) → mol He (want)

Solve it: $\frac{16 \text{ g He}}{1} \left| \frac{1 \text{ mol He}}{4.00 \text{ g He}} \right. = 4 \text{ mol He} =$ **4.0 mol He** (2 SF's ✓)

3. What is the volume, in liters, of 0.50 moles of ammonia, NH_3? (2 SF's)

Map it: mol NH_3 (given) → (22.4 L) (need) → L NH_3 (want)

Solve it: $\frac{0.50 \text{ mol } NH_3}{1} \left| \frac{22.4 \text{ L } NH_3}{1 \text{ mol } NH_3} \right. = 11.2 =$ **11 L NH_3** (2 SF's ✓)

4. How many moles of propane, C_3H_8, are in 67.2 liters of propane? (3 SF's)

Map It: L C_3H_8 (given) $\xrightarrow{22.4\ L}$ (need) mol C_3H_8 (want)

Solve It: $67.2\ \cancel{L\ C_3H_8} \left| \frac{1\ mol\ C_3H_8}{22.4\ \cancel{L\ C_3H_8}} \right. = 3 =$ **3.00 L C_3H_8** (3 SF's ✓)

5. A sample of carbon contains 9×10^{23} atoms of carbon. How many moles of carbon are in the sample? (1 SF)

Map It: atoms C (given) $\xrightarrow{6.02 \times 10^{23}\ atoms}$ (need) mol C (want)

Solve It: $9 \times 10^{23}\ \cancel{atoms\ C} \left| \frac{1\ mol\ C}{6.02 \times 10^{23}\ \cancel{atoms\ C}} \right. = 1.495 =$ **1 mol C** (1 SF ✓)

6. How many molecules of ethane, C_2H_6, are in 4 moles of ethane? (1 SF)

Map It: mol C_2H_6 (given) $\xrightarrow{6.02 \times 10^{23}\ molecules}$ (need) molecules C_2H_6 (want)

Solve It: $4\ \cancel{mol\ C_2H_6} \left| \frac{6.02 \times 10^{23}\ molecules\ C_2H_6}{1\ \cancel{mol\ C_2H_6}} \right. = 2.408 \times 10^{24} =$ **2×10^{24} molecules C_2H_6** (1 SF ✓)

7. What is the mass, in grams, of 1.5×10^{23} molecules of methane, CH_4? (2 SF's)

Map It: molecules CH_4 (given) $\xrightarrow{6.02 \times 10^{23}\ molecules}$ (need) mol CH_4 $\xrightarrow{molar\ mass}$ (need) g CH_4 (want)

Solve It: $1.5 \times 10^{23}\ \cancel{molecules\ CH_4} \left| \frac{1\ \cancel{mol\ CH_4}}{6.02 \times 10^{23}\ \cancel{molecules\ CH_4}} \right| \frac{16.05\ g\ CH_4}{1\ \cancel{mol\ CH_4}} = 3.999 =$ **4.0 g CH_4** (2 SF's ✓)

8. What volume, in liters, is occupied by 15 grams of ethane, C_2H_6? (2 SF's)

Map It: g C_2H_6 (given) $\xrightarrow{molar\ mass}$ (need) mol C_2H_6 $\xrightarrow{22.4\ L}$ (need) L C_2H_6 (want)

Solve It: $15\ \cancel{g\ C_2H_6} \left| \frac{1\ \cancel{mol\ C_2H_6}}{30.08\ \cancel{g\ C_2H_6}} \right| \frac{22.4\ L\ C_2H_6}{1\ \cancel{mol\ C_2H_6}} = 11.17 =$ **11 L C_2H_6** (2 SF's ✓)