

Amount, Mass and Molar Mass WS

1. Determine the molar mass of each of the following substances:

(a) $\text{MgI}_2(\text{s})$

$$95.21 \text{ g/mol}$$

(b) $\text{Al}(\text{OH})_3(\text{s})$

$$78.01 \text{ g/mol}$$

(c) $(\text{NH}_4)_2\text{CO}_3(\text{s})$

$$96.11 \text{ g/mol}$$

(d) $\text{CoCl}_2(\text{s})$

$$129.83 \text{ g/mol}$$

2. Convert each of the following masses into its chemical amount:

(a) 8.40 g of $\text{NaOH}(\text{s})$

$$n = \frac{m}{M} = \frac{8.40 \text{ g}}{40.00 \text{ g/mol}} = \boxed{0.210 \text{ mol}}$$

(b) 4.2 kg of $\text{H}_2\text{O}(\text{l})$

$$n = \frac{m}{M} = \frac{4200 \text{ g}}{18.02 \text{ g/mol}} = 233.074 \dots \text{ mol} = \boxed{2.3 \times 10^2 \text{ mol}}$$

3. Convert each of the following amounts into a mass in grams of the given substance:

(a) 0.456 mol of $\text{Al}_2(\text{SO}_4)_3(\text{s})$

$$m = nM = (0.456 \text{ mol})(342.17 \text{ g/mol}) \\ = 156.029 \dots \text{ g} = \boxed{156 \text{ g}}$$

(b) 18.0 mol of $\text{CuSO}_4(\text{s})$

$$m = nM = (18.0 \text{ mol})(159.62 \text{ g/mol}) = 2873.16 \text{ g} = \boxed{2.87 \times 10^3 \text{ g}} \\ \text{or} \\ \boxed{2.87 \text{ kg}}$$

4. Complete the following table.

Table 1 Molar Calculations

Substance	Molar mass (g/mol)	Mass (g)	Chemical amount (mol)
$\text{CaCl}_2(\text{s})$	110.98	18.6	0.168
$\text{Al}_2\text{O}_3(\text{s})$	101.96	27.2	0.267
$\text{Mg}(\text{OH})_2(\text{s})$	58.33	35.00	0.6000
$\text{Na}_2\text{CO}_3(\text{s})$	105.99	15.9	0.150