

3 Formulae and equations – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)		
Stoichiometry	_____	_____	_____
formulae	_____	_____	_____
equations	_____	_____	_____
molecular formula	_____	_____	_____
empirical formula	_____	_____	_____
ratio	_____	_____	_____
ionic compound	_____	_____	_____
symbol equation	_____	_____	_____
balanced	_____	_____	_____
state symbols	_____	_____	_____
aqueous	_____	_____	_____

Recall

Stoichiometry is about the **amounts** of substances in a reaction. It starts with writing **formulae** and balancing **equations**.

- A formula shows which atoms are in a substance, and how many.
- An equation shows reactants changing into products.

Nothing here is hard – it just needs careful counting.

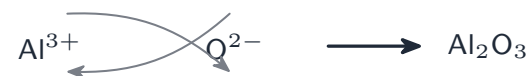
New ideas

Read these first, then do the Practice.

■ 1 Formulae

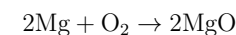
- the **molecular formula** gives the actual number of each atom (glucose: $\text{C}_6\text{H}_{12}\text{O}_6$).
- the **empirical formula** gives the simplest **ratio** (glucose: CH_2O).

For an **ionic compound**, balance the charges so the compound is neutral – the charges **cross over** to become the numbers.



■ 2 Balancing equations

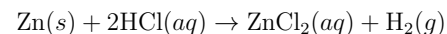
A **symbol equation** must be **balanced** – the **same number of each atom** on both sides:



left:	2 Mg, 2 O	balanced
right:	2 Mg, 2 O	

■ 3 State symbols

Add **state symbols** in brackets: (*s*) solid, (*l*) liquid, (*g*) gas, (*aq*) **aqueous**



Watch out: when balancing you may change only the **big numbers in front** (coefficients) – never the small subscripts inside a formula, as that would change the substance. For an ionic formula the charges **cross over** to become the subscripts.

Practice

Try these in order.

3.1 State the difference between a *molecular* and an *empirical* formula. [2]

3.2 Work out the formula of the compound of Mg^{2+} and Cl^- . [2]

3.3 Balance this equation: $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$. [2]

3.4 What does the state symbol (*aq*) mean? [1]

3.5 Write the symbol equation (with state symbols) for solid zinc reacting with hydrochloric acid to give zinc chloride solution and hydrogen gas. [2]

3.6 Challenge. Balance this equation: $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$. [2]