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.

exercises.lol exercises.com.cn

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: $C_6H_{12}O_6$).
- 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:

$$2Mg + O_2 \rightarrow 2MgO$$

$$2Mg + O_2 \rightarrow 2MgO$$

left: 2 Mg, 2 O

right: 2 Mg, 2 O

balanced

3 State symbols

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

$$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$$

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: $H_2 + O_2 \rightarrow H_2O$. [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: $Fe + O_2 \rightarrow Fe_2O_3$. [2]