Word Equations

In a chemical equation, substances are represented by their chemical formulas. In a word equation, substances are represented in words, using the proper nomenclature. An arrow (→) shows the progression from reactants to products. The Δ symbol means that heat must be applied to initiate the reaction. A plus sign (+) is used to separate one reactant (or product) from another.

Example 1: Write as a word equation: 4 Al + 3 O₂ → Δ 2 Al₂O₃

Solution: aluminum + oxygen → heat aluminum oxide

Note that we do not need to include coefficients in a word equation.

EXERCISES
Express the following chemical equations as word equations:
**In the case of any chemicals that have different names in gas form versus aqueous form, assume the reaction is happening in aqueous solution.**

1) C + O₂ → Δ CO₂
2) 2 Ba + O₂ → Δ 2 BaO
3) 2 Cu + S → Cu₂S
4) 2 P + 3 I₂ → 2 PI₃
5) 2 H₂ + O₂ → Δ 2 H₂O
6) H₂C₂H₃O₂ + NaOH → NaC₂H₃O₂ + H₂O
7) FeCl₃ + 3 KOH → Fe(OH)₃ + 3 KCl
8) 2 Aℓ + 3 CuSO₄ → 3 Cu + Aℓ₂(SO₄)₃
9) \[ 3 \text{Ca(OH)}_2 + 2 \text{H}_3\text{PO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 6 \text{H}_2\text{O} \]

10) \[ 2 \text{K} + 2 \text{H}_2\text{O} \rightarrow 2 \text{KOH} + \text{H}_2 \]

11) \[ \text{Fe}_2\text{O}_3 + 6 \text{HCl} \rightarrow 2 \text{FeCl}_3 + 3 \text{H}_2\text{O} \]

12) \[ 2 \text{NaHCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{H}_2\text{O} + 2 \text{CO}_2 \]

13) \[ \text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2 \]

14) \[ 2 \text{Al} + 6 \text{HCl} \rightarrow 2 \text{AlCl}_3 + 3 \text{H}_2 \]

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**SOLUTIONS**

1) carbon + oxygen $\xrightarrow{\text{heat}}$ carbon dioxide

2) barium + oxygen $\xrightarrow{\text{heat}}$ barium oxide

3) copper + sulphur $\rightarrow$ copper (I) sulphide

4) phosphorus + iodine $\rightarrow$ phosphorus triiodide

5) hydrogen + oxygen $\xrightarrow{\text{heat}}$ water

6) acetic acid + sodium hydroxide $\rightarrow$ sodium acetate + water

7) iron (III) chloride + potassium hydroxide $\rightarrow$ iron (III) hydroxide + potassium chloride

8) aluminum + copper (II) sulphate $\rightarrow$ copper + aluminum sulphate

9) calcium hydroxide + phosphoric acid $\rightarrow$ calcium phosphate + water

10) potassium + water $\rightarrow$ potassium hydroxide + hydrogen

11) iron (III) oxide + hydrochloric acid $\rightarrow$ iron (III) chloride + water

12) sodium bicarbonate + sulphuric acid $\rightarrow$ sodium sulphate + water + carbon dioxide

13) zinc + sulphuric acid $\rightarrow$ zinc sulphate + hydrogen

14) aluminum + hydrochloric acid $\rightarrow$ aluminum chloride + hydrogen