

The Material World: Balancing Equations

2. Balancing Chemical Equations: A Quick Review

Equations have to be balanced because in reality chemical reactions cannot destroy atoms; they only ionize or rearrange them.

RULES

1. You may introduce coefficients (big #s in front of formulas or atomic symbols). Remember the coefficients can be thought of as the number of bound atoms or molecules.
2. You cannot change or add subscripts (small # s that are part of formulas)
3. For each element, the total on the L.H.S. (Left Hand Side)= total on R.H.S. of the equation.

Examples:

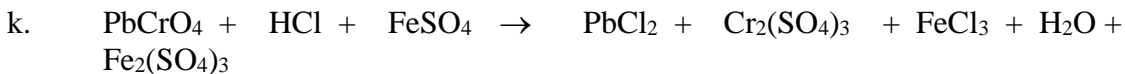
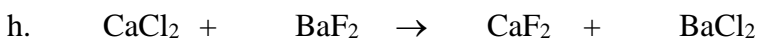
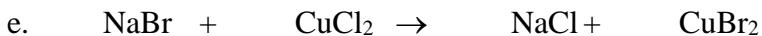
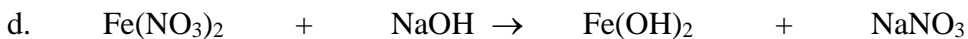
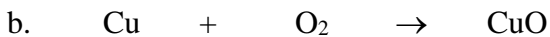
1. Balance :
 - a. $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$ (also draw this one out)
 - b. $\text{Ca(OH)}_2 + \text{HF} \rightarrow \text{CaF}_2 + \text{H}_2\text{O}$
(also draw this one out)
 - c. $\text{C}_7\text{H}_{16} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 - d. $\text{Na}_3\text{PO}_4 + \text{CaCl}_2 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + \text{NaCl}$
 - e. $\text{K}_2\text{SO}_{4(\text{aq})} + \text{Mg(NO}_3)_{2(\text{aq})} \rightarrow \text{KNO}_{3(\text{aq})} + \text{MgSO}_{4(\text{s})}$
 - f. $\text{C}_6\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 - g. $\text{N}_2 + \text{F}_2 \rightarrow \text{NF}_3$

Example 2 Translate example 1 into a word equation

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Exercises

1. Balance the following. If the equation is already balanced, indicate that it is.



2. Draw **1b** and **1m** after they have been balanced.

3. Translate 1i and 1j into words.