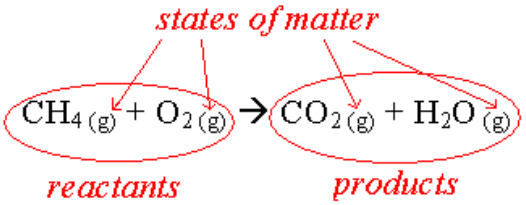
Balancing a Reaction

1. Indicate the reactants side, products side and states of matter in the reaction equation below.



2. What are the 4 primary states of matter?

   a. Solid – (s)

   b. Liquid – (l)

   c. Gas – (g)

   d. Aqueous – (aq) – dissolved in water

3. Why do we have to balance reactions?

   Because matter cannot be created or destroyed (The Law of Conservation of Matter). This means that we cannot have more of a substance on one side of the reaction equation than the other – that would indicate that some of the substance was destroyed or created in the process of the reaction – which, as this law states, cannot happen.

4. Before we can utilize a reaction in problem solving you must balance the equation. This means we add coefficients to the equation we do NOT alter the subscripts in the formulae.

5. How do you know when a reaction has been balanced?

   When the total moles of every element in the reaction is equal on both side of the equation.

Additionally, always be sure that you have the lowest ratio between coefficients in a balanced equation. For example, if your final balancing resulted in the following:

$$3A + 6B \rightarrow 3AB_2$$

Though we have 3 moles of A and 6 moles of B on both sides – the coefficients are not at the smallest ratio to one another. SO the final balanced equation would look like:

$$A + 2B \rightarrow AB_2$$

6. Balance the following equations

a. $2Eu_{(s)} + 6HF_{(g)} \rightarrow 2EuF_{3(s)} + 3H_{2(g)}$

b. $(2NH_{3(g)} + {}^{5}/_{2}\, O_{2(g)} \rightarrow 2NO_{(g)} + 3H_2O_{(g)})x2$

sometimes balancing is easiest when you utilize fractions. Just make sure you have all whole numbers at the end of balancing. In this case, multiplying everything by 2 eliminates the fractions.

$4NH_{3(g)} + 5\, O_{2(g)} \rightarrow 4NO_{(g)} + 6H_2O_{(g)}$ ← Final Answer