Balancing Equations Practice Problems Key Script

Balancing Equations Practice Problems

Once you have had an opportunity to try the practice problems on your own, use this video to check your work and see if you've been successful.

On the first practice problem we have sulfur reacting with oxygen to produce sulfur trioxide. Remember, the first step is to list your elements. So we have sulfur and oxygen on each side of the reaction. On the reactants side, we have eight sulfur atoms and two oxygen atoms, and on the products side, we have one sulfur and three oxygen atoms. You can see that neither of these elements are balanced.

So, we will begin with the sulfur atoms. In order to have an equal number of eight atoms on each side of the reaction, we will multiply the one sulfur atom on the products side by eight, to give us a total of eight sulfur atoms on each side. Remember that the eight goes up in the blank as the coefficient to show the eight sulfur atoms total. When you place the eight coefficient in the blank, remember to box in that molecule and that also applies to the oxygen atoms. So, the subscript of three oxygen atoms, multiplied by the coefficient of eight, will give you a total of 24 oxygen atoms on the products side. Now the sulfur atoms are balanced. There are eight sulfur atoms on the reactants side and eight atoms on the products side.

Now, looking at the oxygen atoms, we have 24 on the products side, and therefore, need to have 24 on the reactants side. So, the two atoms that we began with of oxygen on the reactants side times 12 will give us the 24 total oxygen atoms, and that 12 will become your coefficient for oxygen. Now we can see that the oxygen atoms on the reactants side and the products side are balanced.

Nothing goes in the first blank because we did not need to multiply the sulfur by any coefficients in order to be balanced. So, now according to the law of conservation of mass, this equation is now balanced.

Practice problem number two: phosphorous reacting with oxygen to produce diphosphorous pentaoxide. The first step, list your elements, phosphorous and oxygen, and remember to list them in the same order on each side of the reaction. On the reactants side, we begin with one phosphorous atom and two oxygen atoms, and on the products side, we begin with two phosphorous atoms and five oxygen atoms. At this point, neither of those atoms are balanced.

We will begin with the oxygen atoms. At times it is necessary to multiply both the reactants side and the products side for an atom in order to get it balanced. So, on the reactants side, we will multiply the two oxygen atoms we began with, times five, to produce a total of ten oxygen atoms. On the products side, we began with five oxygen atoms, and we will multiply that by two in order to have a total of 10 oxygen

atoms. Both of those multiplier numbers will go up in the blanks as coefficients, so you will have a coefficient of five on the reactants side and a coefficient of two on the products side. Now our oxygen atoms are equal.

Remember, when you place the two of the coefficient on the products side, box in that molecule to remind yourself that that two also applies to the phosphorous atom. So, now we will multiply the original two phosphorous atoms times two, the coefficient, to get a total of four phosphorous atoms on the products side. We will need to, on the reactants side, also multiply times four, placing the coefficient in the blank, so that we have a total of four phosphorous atoms on the reactants side, to equal the four phosphorous atoms on the products side. Now, both the phosphorous atoms and the oxygen atoms are balanced. So, according to the law of conservation of mass, this equation is now balanced.