

Balancing Equations Tutorial Script

Balancing Equations

In this video tutorial, you will see a step-by-step process for balancing chemical equations. You will need to have your notebook ready so that you can take notes as we go.

Remember, equations are balanced when there is the same number of each type of atom on each side of the equation.

Let's start with this reaction. Take a moment and write down this reaction just as you see it on the screen. We have nitrogen reacting with hydrogen to produce ammonia.

The first step in balancing a chemical equation is to list each type of atom that you have in the reaction. So, we're going to list nitrogen and hydrogen. We have those atoms on each side of the chemical reaction, so list them in the same order on each side.

The next step is to count how many atoms that there are to begin with. So you can see that there are two nitrogen atoms on the left, on the reactants side, and there are two hydrogen atoms. On the products side, we have one nitrogen atom and three hydrogen atoms. To look at the count of nitrogen atoms and hydrogen atoms, you notice that neither one of those are balanced because there are two nitrogen atoms on the left and one on the right, and that is not balanced. The same with the hydrogens, there are two on the left and three on the right, and that also is not balanced.

But, let's begin looking at the nitrogen atoms. We have two on the left and one on the products side, so we can multiply the one nitrogen atom on the products side by two and that will give us a total count of two nitrogen atoms. So, we need multiples of this molecule in order to have the correct number of nitrogen atoms.

When you multiply by two, that two becomes the coefficient in front of the ammonia molecule. When you write the two, box in that molecule to remind yourself that that two also applies to the hydrogen atom. So now we have the original three hydrogen atoms times two from the coefficient that we placed up in the blank, and now we have a count of six hydrogen atoms.

So, the nitrogen atoms are now balanced with two on the left and two on the right. Looking at the hydrogen atoms, there are two hydrogen atoms on the left and six, now, on the right, on the products side. So, we will move to the reactants side and multiply by three so that now we have six total atoms of hydrogen on the reactants side. Remember that three is placed in the blank above to become your coefficient because that means we have three multiples for a total of six atoms.

Now, both the nitrogen and hydrogen atoms are balanced because the nitrogen atoms are equal to each other on each side and the hydrogen atoms are six on the reactants side and six on the products side. Nothing goes in the blank in front of the nitrogen because we didn't need any more nitrogen to be balanced. According to the law of conservation of mass, this equation is now balanced and you can use this step-by-step process to balance other chemical equations.