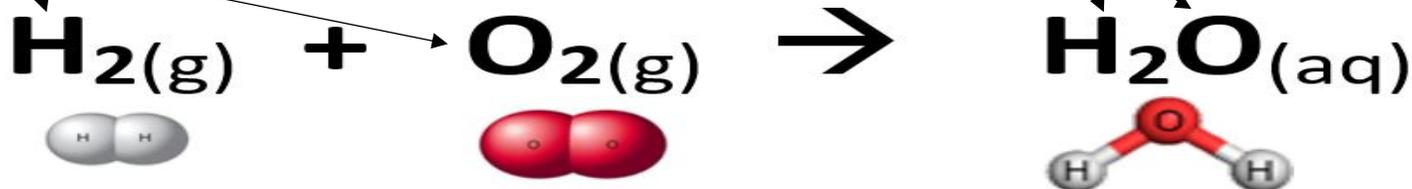


# Balancing Chemical Equations

**You Should Know:** The law of conservation of mass tells us that, there must be equal amounts of matter (mass) left over after the reaction as there was before the reaction started. Easy stuff right.....

**Well.....** most chemical equations are originally unbalanced. Take a look at the equation below

- ✓ In the Reactants there are 2 total Hydrogens and 2 total Oxygens
- ✓ In the Products there are 2 total Hydrogens also, but there is only 1 Oxygen.
- THIS IS A PROBLEM, according to the law of conservation of mass.



**So Let's fix it,** this is called **BALANCING** the EQUATION

- ➔ We will add molecules or compounds to either the reactants, products or both.
- ➔ The goal is to get equal amounts of atoms in the reactants and products. [amount of reactants = amount of products]

**STEP 1:** remove the equation and just look at the molecules and compounds.

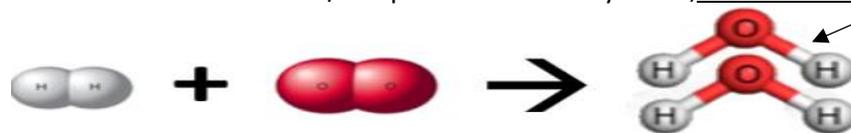
- ✓ We need more Oxygens in the products.



**STEP 2:** So we have to get one more Oxygens in the Products, but we **CAN'T DO THIS!!!**



**STEP 2:** You have to put in a whole entire molecule/compound as it already exists, **DO IT LIKE THIS!!!**



**Results of Step 2:** Now there are an equal amount of Oxygens, but doing this unbalanced the Hydrogens.

- ➔ Reactants [2 Hydrogen & 2 Oxygen] → Products [4 Hydrogen & 2 Oxygen]

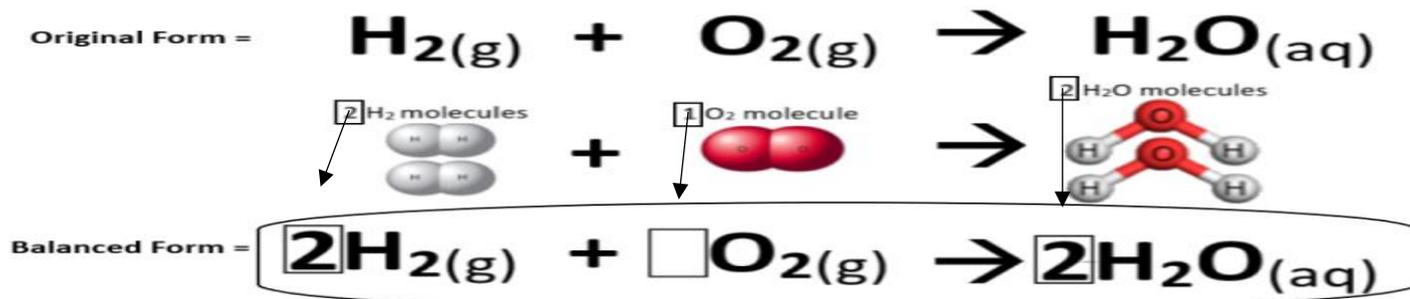
**STEP 3:** So now we must go back and add more Hydrogens, by adding a whole H<sub>2</sub> molecules.



**Results of Step 3:** Now there are equal amounts of Oxygen and Hydrogens in both the reactants and products.

- ➔ Reactants [4 Hydrogen & 2 Oxygen] → Products [4 Hydrogens & 2 Oxygens]
- ➔ THIS IS EQUATION IS BALANCED, it satisfies the Law of Conservation of Mass

**STEP 4:** Now write the balanced form of the Equation, using coefficients to show how many molecules are needed.



**Coefficients:** The numbers in front of the molecules/compounds are coefficients, and just like in math, you don't have to write a coefficient if it is 1