

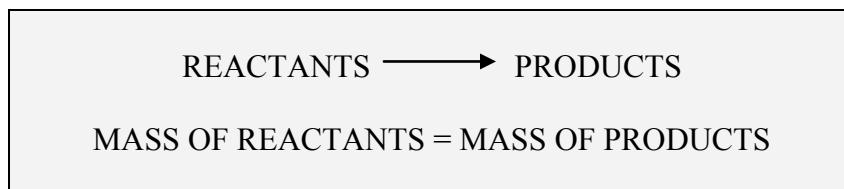
WHAT IS THE LAW OF CONSERVATION OF MATTER?

Democritus (460-370 BC) and some time later John Dalton (1766-1844) were the first to come up with the concept of the "atom" as being the smallest indivisible form of matter. We know that atoms form molecules and also that atoms and molecules interact to form new substances during a chemical reaction. Since atoms are indivisible, then they cannot be destroyed during a chemical reaction. Thus the statement:

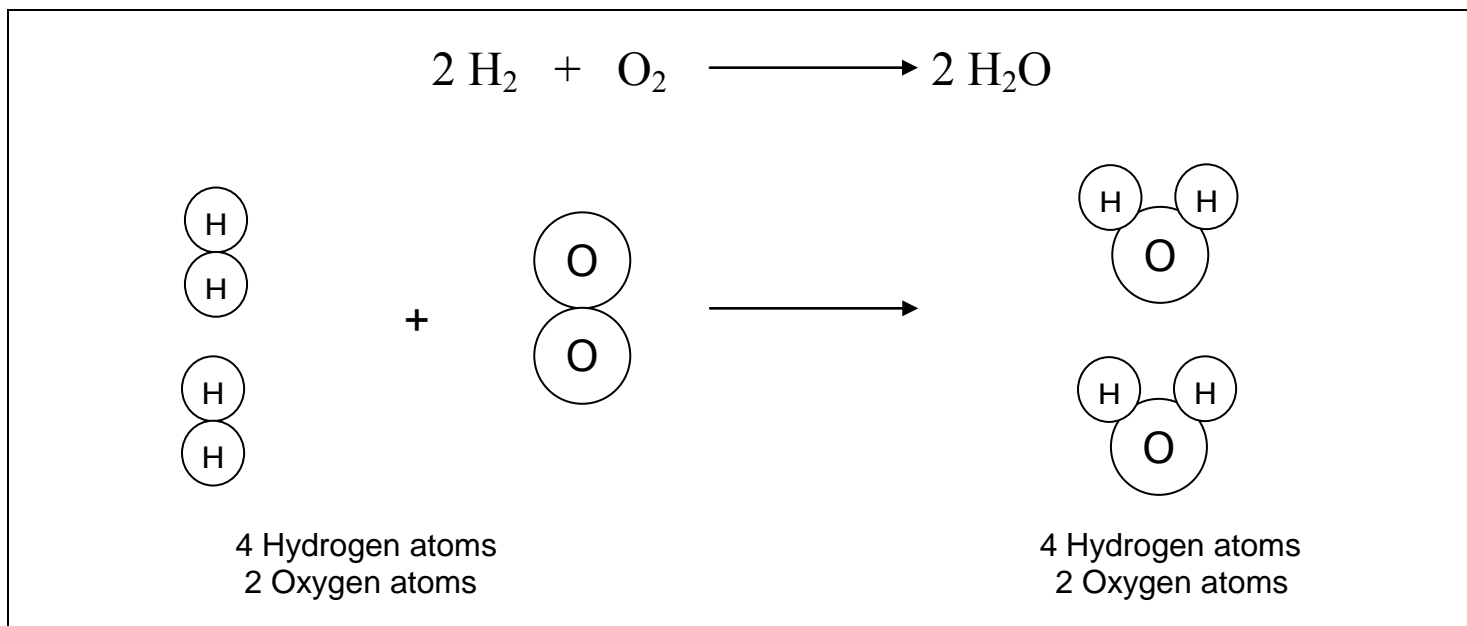
"The mass of the reactants must equal the mass of the products in a chemical reaction."

or

"Matter cannot be created or destroyed."



The following diagram of the reaction between hydrogen and water further illustrates this idea.



The important thing to notice here is that while the atoms are rearranged, they are not created or destroyed – therefore conserving mass. We can use this law when we make chemical calculations.

For example, we know that a nail will rust if combined with oxygen. The rust that is formed is called iron oxide, which is a combination of iron (from the nail) and oxygen (in the air). Lets say that 100 grams of iron nails is exposed to oxygen and allowed to rust. When we weigh the rusty nails, we find that they weigh 143 grams. With this information we can determine the amount of oxygen that must have reacted with the iron to form iron oxide. In this case, 43 grams of oxygen must have reacted with the iron.

Iron + Oxygen → Iron Oxide (rust)

100 grams + ? → 143 grams

Mass of reactants = mass of products

100 grams + 43 grams → 143 grams