

Balancing Reactions



2 Cracker Squares + 1 Marshmallow + 3 Chocolate Squares \longrightarrow 1 S'more

2 Cq + 1 Mm + 3 Ch \longrightarrow 1 Cq₂MmCh₃

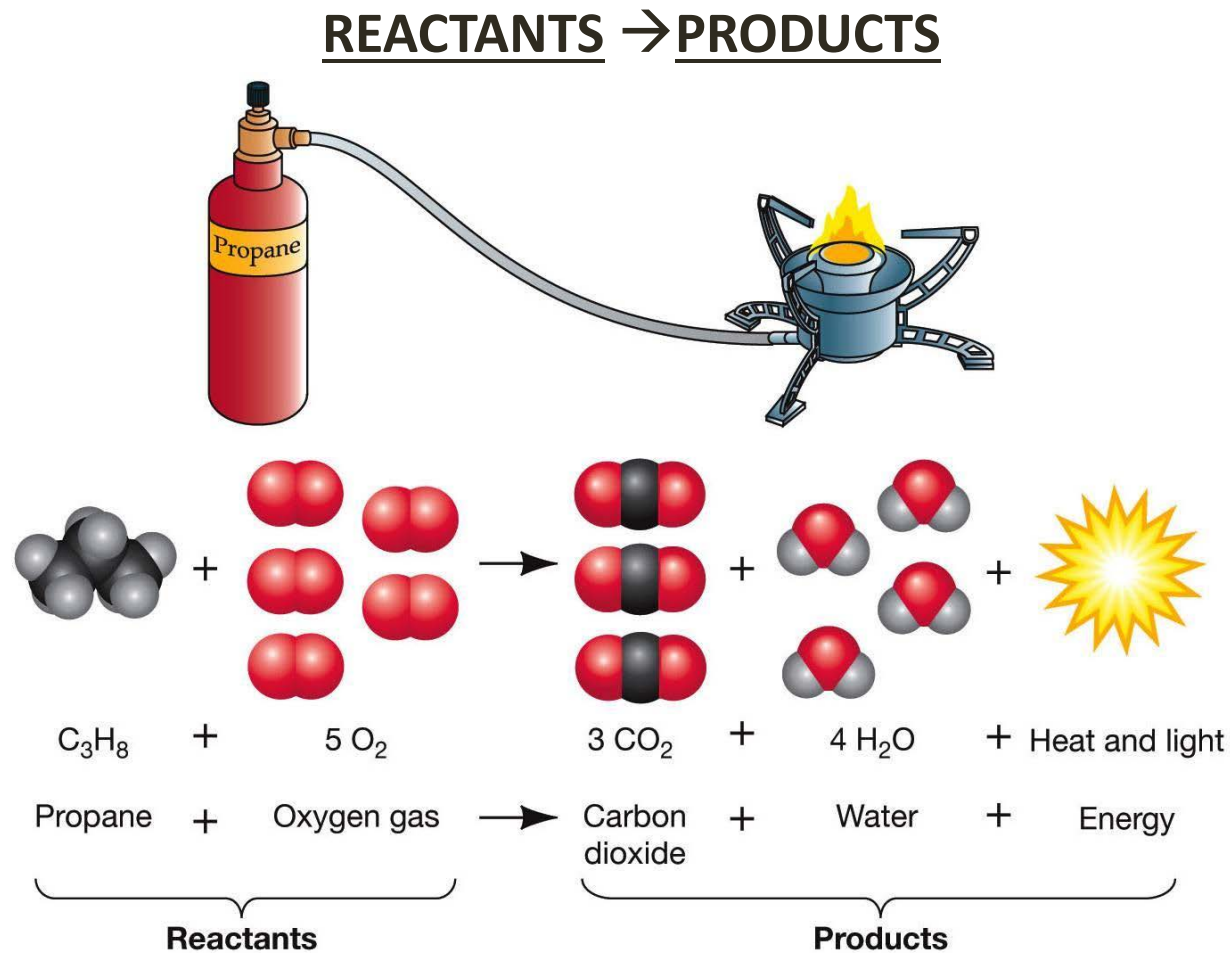
<http://sanmccarron.blogspot.ca/2013/01/why-balance-chemical-equations.html>

Outcome:

Write & Classify balanced chemical reactions from written descriptions of reactions.

Chemical Equations

An **EQUATION** describing the **PROCESS** specific **SUBSTANCES** undergo to produce **NEW SUBSTANCES**.



LIFE 8e, Figure 2.13

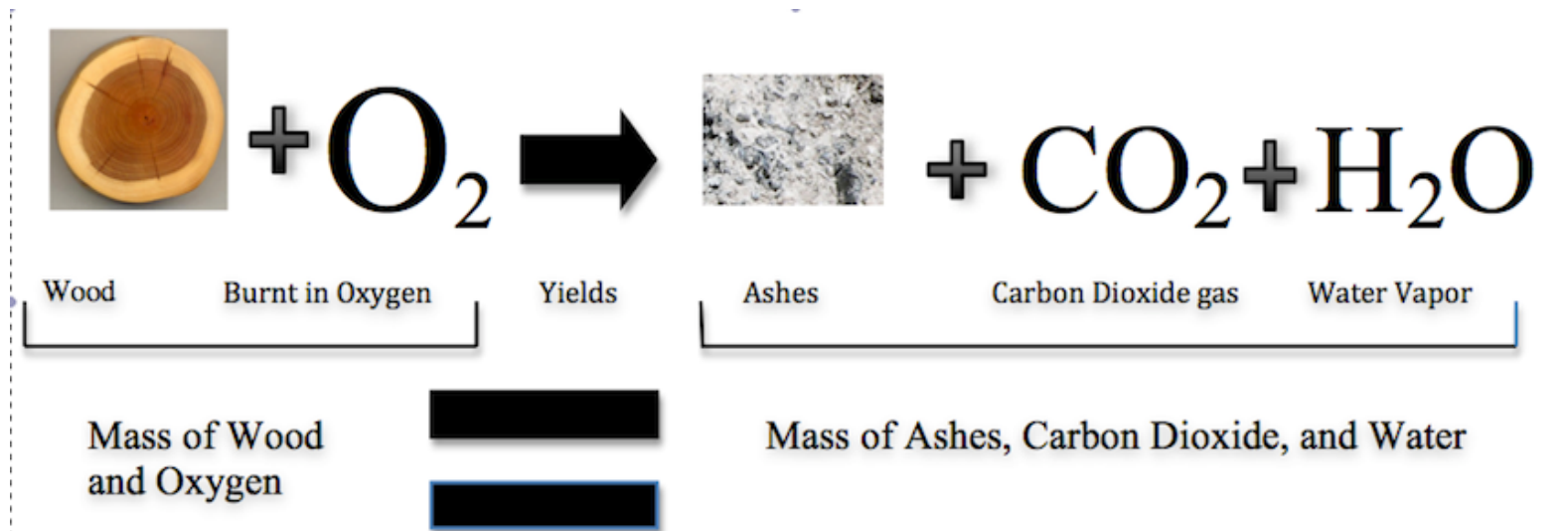
Law of Conservation of Mass:

The law of conservation of mass states:

Matter cannot be created nor destroyed

The **TOTAL MASS** of the **REACTANTS** is *equal* to the **TOTAL MASS** of the **PRODUCTS** in a chemical reaction.

Thus, the same number of **ATOMS** of *each kind of element* must appear on each side of the equation. → **BALANCING!**



Steps to Balancing Equations:

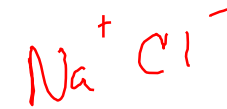
Step 1:

Determine the **REACTANTS** and **PRODUCTS** (can be tricky in word problems).

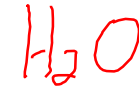
Example:

“Sodium metal combines with chlorine gas to produce sodium chloride”

Reactants → ^{Na} **Sodium** & ^{Cl₂} **Chlorine**
Products → **Sodium chloride** ^{NaCl}

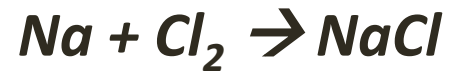


Steps to Balancing Equations:



Step 2:

ASSEMBLE the parts of the chemical **EQUATION**, **REACTANTS** on the **LEFT**, **PRODUCTS** on the **RIGHT**, separated by an **ARROW**.



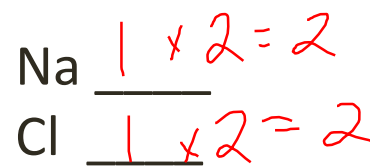
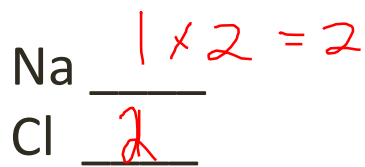
All compounds must be **NEUTRAL (NO CHARGE)**

Elemental gases (**DIATOMIC** molecules) must be written as such.

Steps to Balancing Equations:

Step 3:

- Make a **LIST** of the atoms composing **REACTANTS** and **PRODUCTS**. Both lists need to be the **SAME!!!**
- **COUNT** the number of **ATOMS** of each **ELEMENT**, and enter in the list.
- Change the **COEFFICIENTS** in the equation so you have the **SAME AMOUNT** of each **ELEMENT** on each **SIDE**.



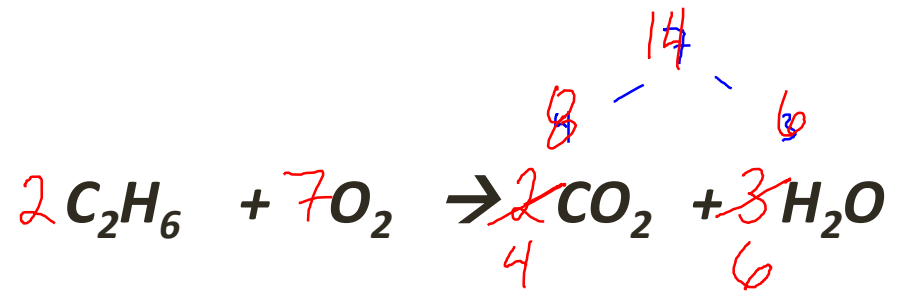
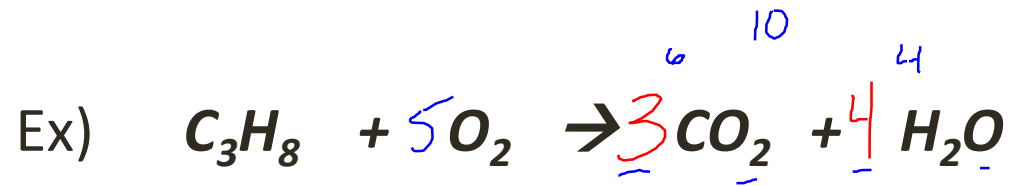
You must balance the equation using **WHOLE NUMBERS ONLY**. No **FRACTIONS** or **DECIMALS** allowed.

Result:

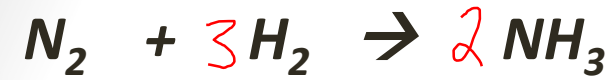
Balancing Reactions

3x

To balance Combustion reactions, we balance them in ALPHABETICAL order...Carbons then Hydrogens then Oxygens



Try these ones...



What the heck are moles???

Note:

On the ATOMIC scale, the COEFFICIENTS are used to denote INDIVIDUAL atoms or MOLECULES:

“2 atoms Na metal combine with 1 molecule Cl₂ gas to produce 2 molecules of sodium chloride.”

This is not a practical scale since atoms are so small (there are billions and billions of sodium atoms in a grain of salt). Therefore we use a bigger scale like moles. **More on moles later...**