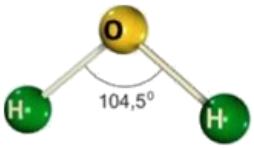
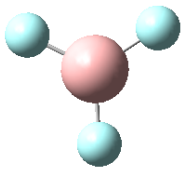
# <u>PRÁCTICA 10</u>: UNDERSTANDING CHEMICAL REACTIONS. BALANCING.

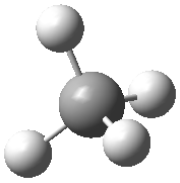
**Objectives:** Construct molecules following rules and try to find the formulae that represent them. After that we are going to simulate a chemical reaction to understand how atoms break their bonds and create new ones, verifying the law of conservation of mass (Lavoisier).

**Rules:**

1. Each element has a combining capacity that you must respect. If, for example, you are told that the combining capacity of O is 2, from the atom of oxygen you will use two toothpicks to link it to other atoms (of if it is linked to only one atom it is going to use a double bond).
2. All the toothpick ends must have atoms (they cannot be uncovered). The can end in the same atom one time (single bond), twice (double bond) or three times (triple bond).
3. The atoms that join to a central atom tend to stay as far to each other as possible to avoid repulsions between the electrons of the bond (negative particles tend to repel).





4. Indicate with subscripts the number of atoms of each element.

**Procedure:** Construct the plasticine balls that we are going to use to represent the atoms, following this colour code:

White → Hydrogen  Red→ Oxygen  Black → Carbon

**Size ratio**: The smaller balls will be the white ones, because the atom of hydrogen (radio: 0,32 Å) is the smallest in all the periodic table. Oxygen is 0,73 Å and Carbon 0,77 Å. All the balls of the same colour must have the same size!

**Draw and construct the following molecules:**

| Atoms to link | O |
|---|---|
| # of atoms | 2 |
| Combining capacity | 2 |

**Drawing:**

| Atoms to link | C | H |
|---|---|---|
| # of atoms | 1 | 4 |
| Combining capacity | 4 | 1 |

**Drawing:**

Do you know what the exothermic reaction that takes place between these two compounds (reactants) is? Try and write it down below:

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After having shown your teacher the reactants molecules you just constructed, break the bonds and recombine the atoms to form the expected products. They must comply with the following specifications:

| Atoms to link | H | O |
|---|---|---|
| # of atoms | 2 | 1 |
| Combining capacity | 1 | 2 |

**Drawing:**

| Atoms to link | C | | O |
|---|---|---|---|
| # of atoms | 1 | | 2 |
| Combining capacity | 4 | | 2 |

**Drawing:**

What happens when you try to recombine the atoms of the reactants to get the products?

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Balance the reaction using the method with studied in class, and reconstruct all the molecules of the reactants you get in the balanced equation. Now break again the bonds, and try and construct the products. Do you get to use all the atoms with no excess or lack, and with no toothpick with an empty end?

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To end up, show your teacher the final molecules you have.