



# SHS LEARNING ACTIVITY

CHEM1-06-01

Name: \_\_\_\_\_ Score/Mark: \_\_\_\_\_

Grade and Section: \_\_\_\_\_ Date: \_\_\_\_\_

Strand:  STEM  ABM  HUMSS  ICT (*TVL Track*)

Type of Activity :  Concept Notes  Skills: Exercise/Drill  Illustration

Laboratory Report  Essay/Task Report  Other: \_\_\_\_\_

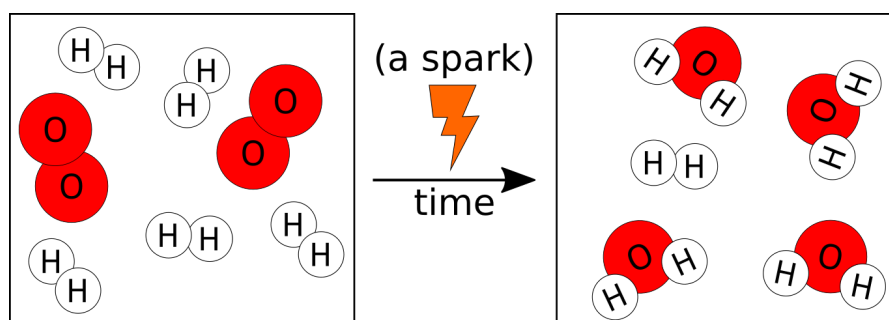
Activity Title: 06-01.Stoichiometry - Reactions and equations v03

Learning Target: To visualize reactions and start balancing equations

Authors/References: Victor Sojo

So far, we have just been naming and describing elements and compounds. But chemistry is the science of **changing substances**, not static matter.

When a substance changes into another, we call this a **chemical reaction**:



Here, hydrogen and oxygen (the **reactants** or **reagents**) **reacted**, forming water (the **product**). **Count the atoms**; you'll see that the numbers for each element are exactly the same before and after: the atoms only rearrange, their numbers remain the same in chemical reactions (nuclear reactions are an exception, but we won't study them here). You'll also notice that some of the H<sub>2</sub> didn't have any O<sub>2</sub> to react with, so it was left unreacted.

These simple relations have allowed chemists to create very simple mathematical expressions to easily calculate quantities in reactions:



Like all good mathematical equalities, these **chemical equations** must be **balanced** (what's on the left-hand side must be **equal** to what's on the right-hand side). Let's count the atoms again. One oxygen seems to have disappeared! That cannot be, so let's fix it by multiplying water by 2:



That helped, but now we messed up the hydrogen. It's easy to fix it:



We read this as: "two molecules of hydrogen react with one molecule of oxygen and produce (or yield) two molecules of water".

**Exercise:** balance the equation for the formation of Al<sub>2</sub>O<sub>3</sub> from Al and O<sub>2</sub>.

