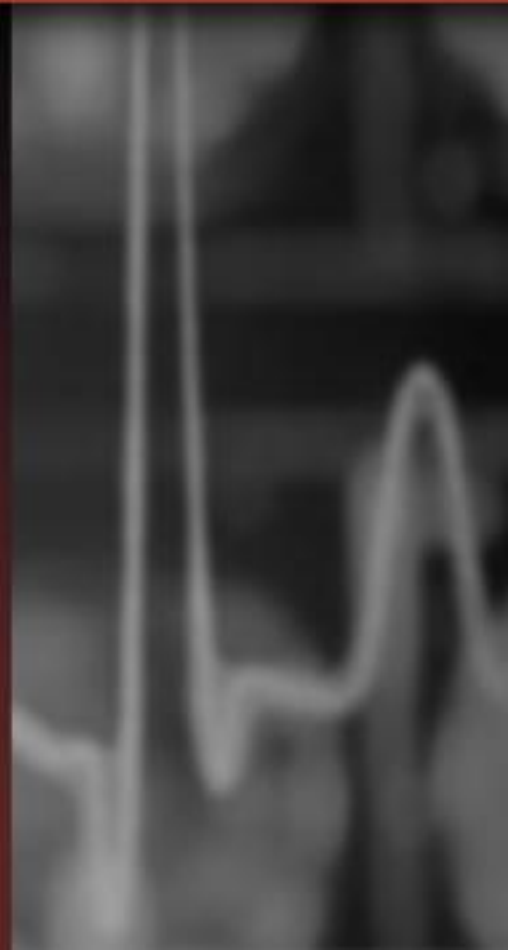


What is a Chemical Reaction?



Objective:

1. To be able to explain that for a chemical reaction to take place, the bonds between atoms in the reactants are broken, the atoms rearrange, and new bonds between the atoms are formed to make the products.
2. To be able to explain that in a chemical reaction, no atoms are created or destroyed.

Physical Change

- When molecules speed up or slow down
—————→ **PHYSICAL CHANGE**
- When they change state- solid to liquid or liquid to gas → **PHYSICAL CHANGE**
- When no new substance has been formed
—————→ **PHYSICAL CHANGE**

Chemical Change

- In a chemical change, the atoms in the reactants rearrange themselves and bond together differently to form one or more new products with different characteristics than the reactants.

DEMONSTRATION

- In most chemical reactions, two or more substances, *called reactants*, interact to create different substances called *products*.
- What do you think are the reactants in this demonstration of a chemical reaction? (Question 1)
- **Candle Wax and Oxygen (from the air)**
- Will the candle still burn if one of the reactants (wax or oxygen is no longer available?

Why do you think the flame goes out when we put a jar over the candle? (Question 3)

When a candle burns for a while it eventually gets smaller. Where does the candle wax go?

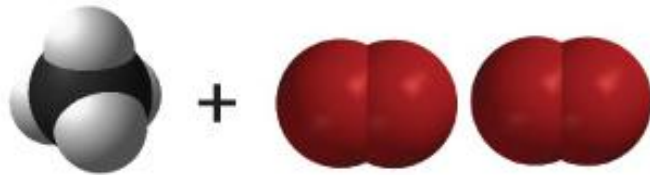


What are the products in this chemical reaction? (Question 2)

Combustion of Methane

Methane and Oxygen React

REACTANTS

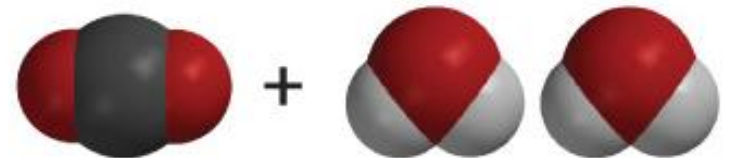


CH_4
methane

2O_2
oxygen



PRODUCTS



CO_2
carbon dioxide

$2\text{H}_2\text{O}$
water

- In the reaction, the little bonds in the methane and oxygen come apart, the atoms rearrange and then re-bond to form water and carbon dioxide.
- The little number written in the lower right after an atom (subscript) tells how many of that atom are in the molecule.
- The big number written in front of a molecule (coefficient) shows how many of that molecule there are.
- All the atoms in the products come from the atoms in the reactants.

Where do the atoms come from that make the carbon dioxide and the water on the right side of the equation? (Question 4)

ACTIVITY:

- You will be making a model to show that in a chemical reaction the atoms of the reactants rearrange to form products.
- Follow the directions on your lab activity sheet.

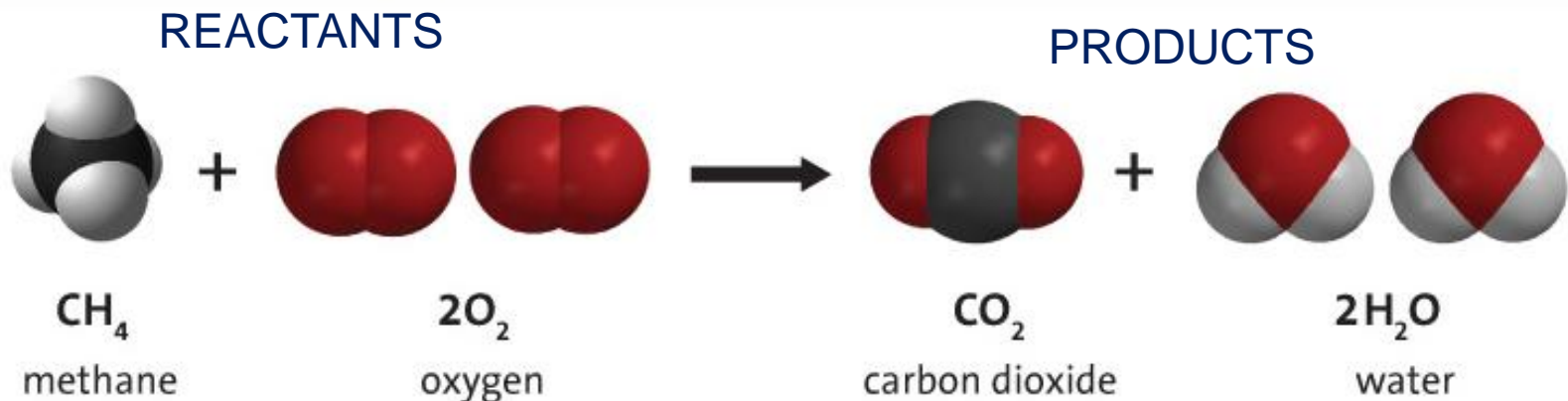
Animation of Combustion of Methane

[combustion of methane](#)

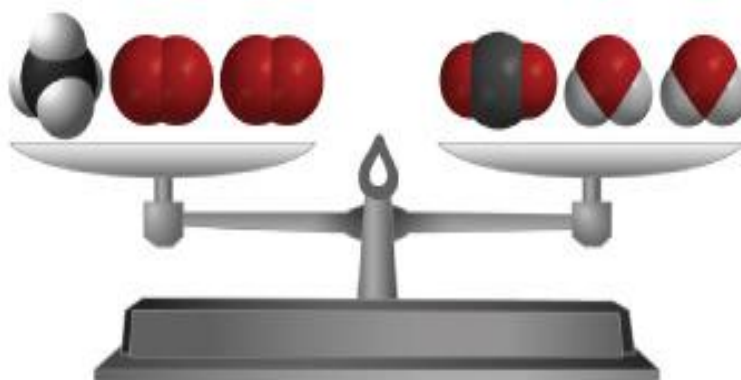
How many carbon, hydrogen, and oxygen atoms are in the reactants compared to the number of carbon, hydrogen, and oxygen atoms in the products? (IAN pg.)

Atoms	Reactant Side	Product Side
Carbon	1	1
Hydrogen	4	4
Oxygen	2	2

Methane and Oxygen React



Balanced Equation



- All the atoms in the reactants form the products so the mass of the reactants and the products is the same.
- No new atoms are created and no atoms are destroyed.

Key Concepts:

- A **physical change**, such as a state change or dissolving, **does not create a new substance**, but a chemical change does.
- In a chemical reaction, the atoms and molecules that **interact with each other** are called **reactants**.
- In a chemical reaction, the atoms and molecules **produced by the reaction** are called **products**.

Key Concepts continued

- In a chemical reaction, **only the atoms present in the reactants can end up in the products.** No new atoms are **created**, and no atoms are **destroyed**.
- In a chemical reaction, **reactants** contact each other, **bonds between atoms** in the reactants **are broken**, and **atoms rearrange to form new bonds** to make the **products**.