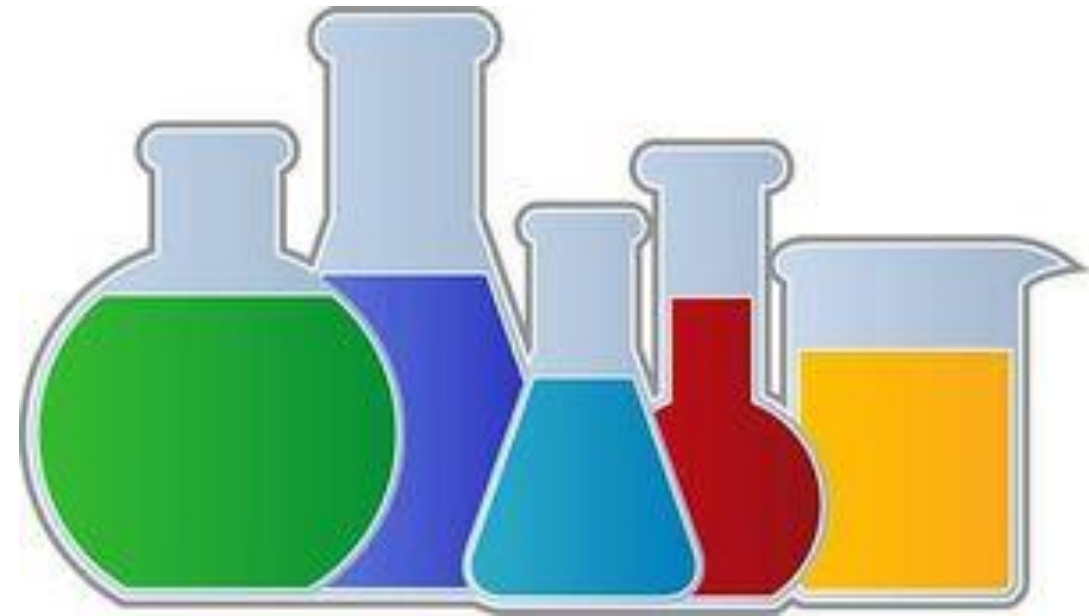
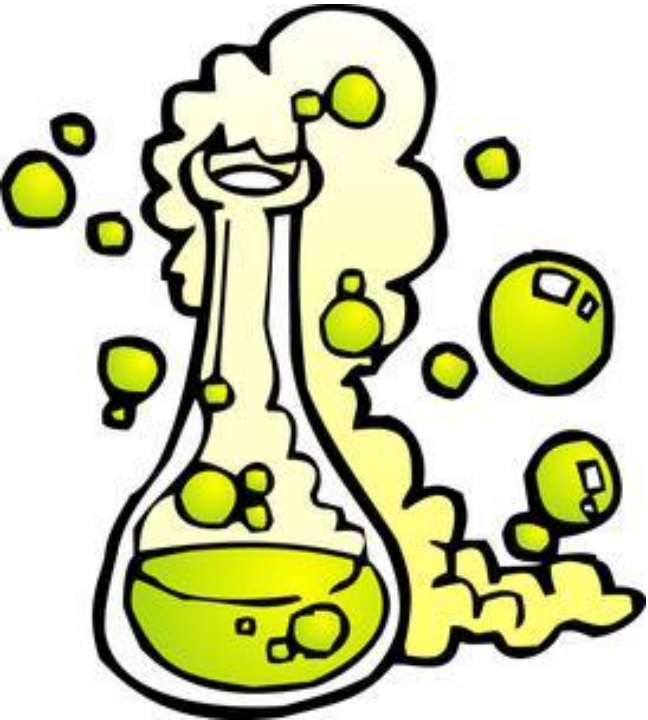


# [1.6] Chemical Reactions

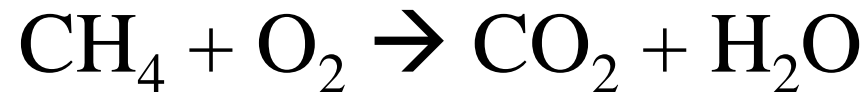


# Chemical Equations

- Represent a **chemical reaction**
- Are made up of two parts:

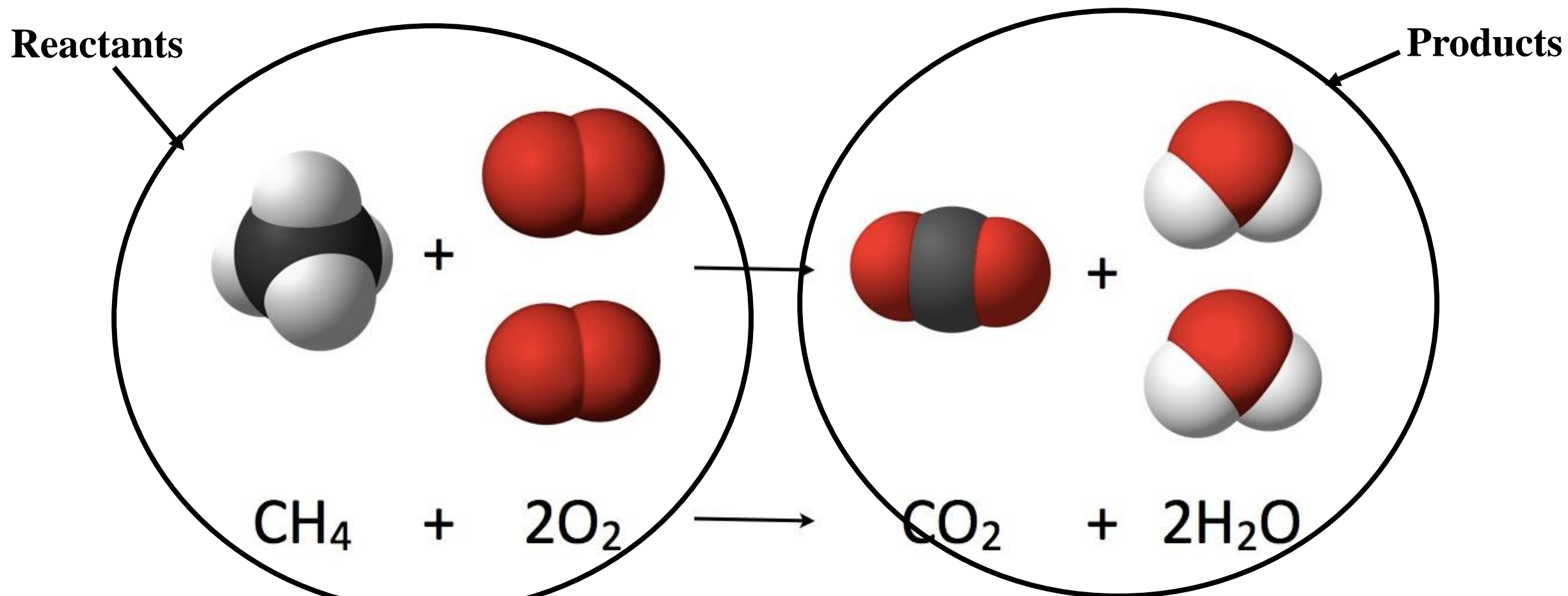
**Reactants → Products**

**Example:** methane + oxygen → carbon dioxide + water



# Chemical Equations

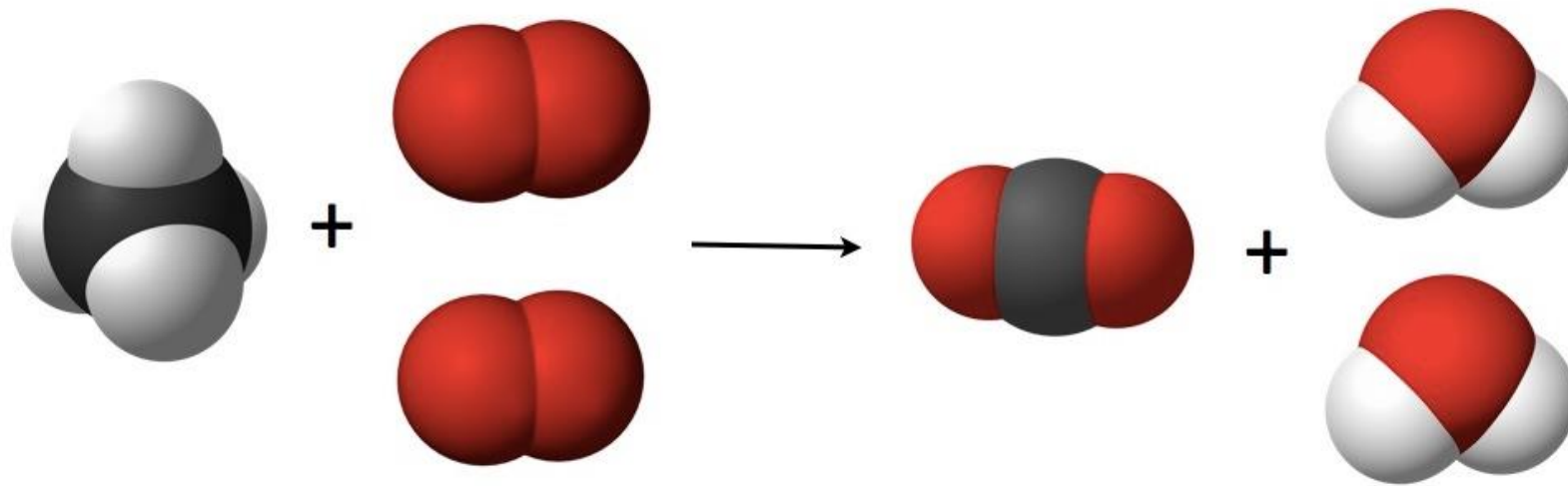
- **Reactants** are listed on the **left side** and separated by a plus sign (+)
- **Products** are listed on the **right side** and separated by a plus sign (+)



# Word Equations

- **Word Equations:** only the **chemical names** of the reactants and products are shown.

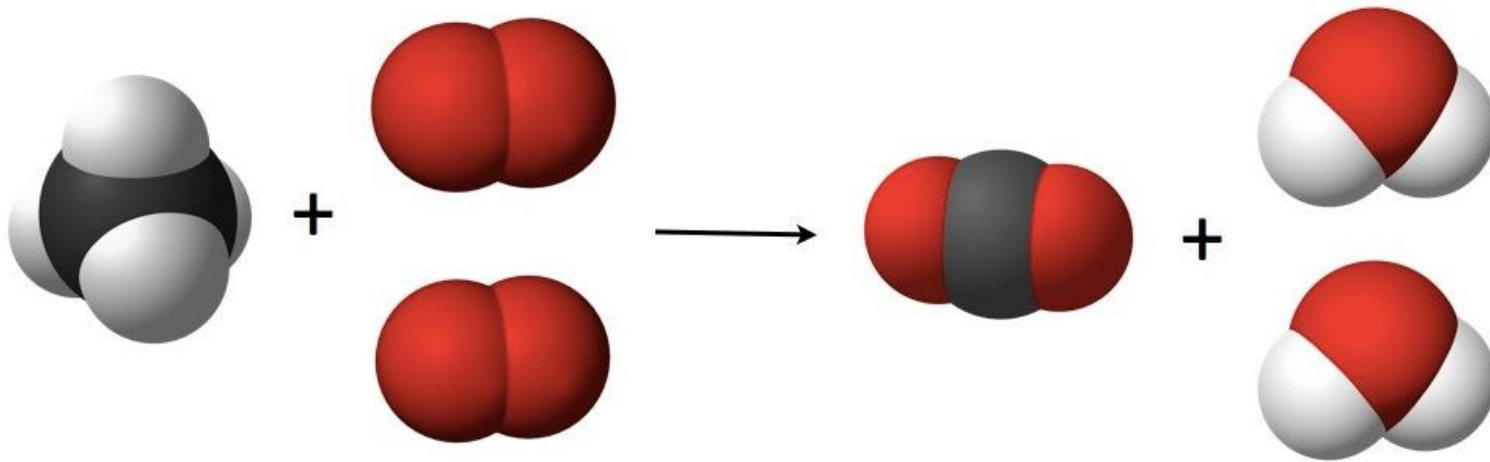
**Example:** methane + oxygen  $\rightarrow$  carbon dioxide + water



# Skeletal Equations

- **Unbalanced** system where the chemical names are converted to chemical symbols/formulas

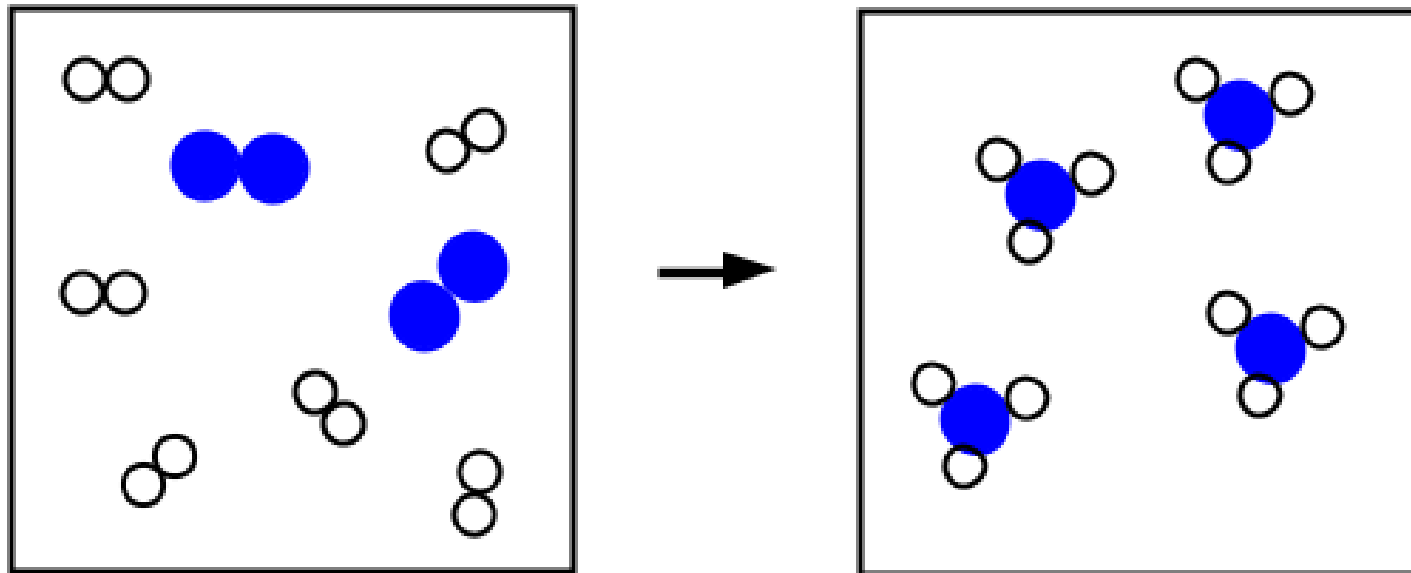
- **Example:**  $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$



# Law of Conservation of Mass

- Matter (atoms) **cannot be created or destroyed**, however may change forms
- **Mass remains the same** in a chemical reaction

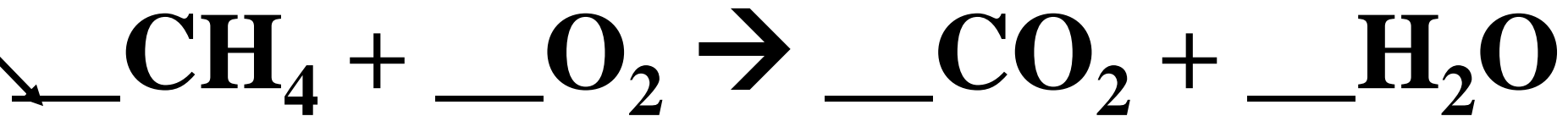
**Mass of reactants = Mass of products**



# Balanced Chemical Equation

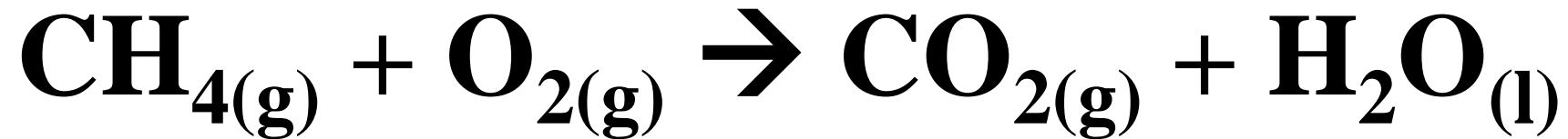
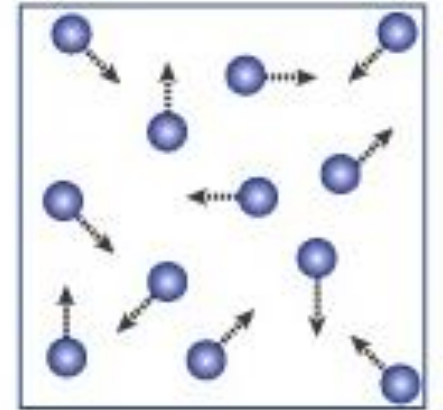
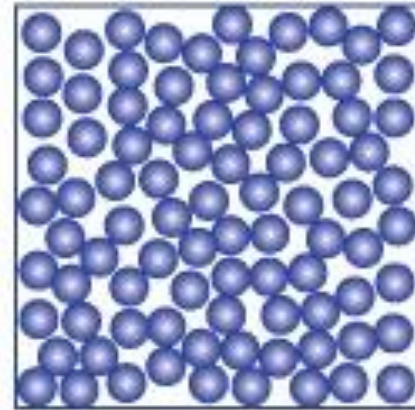
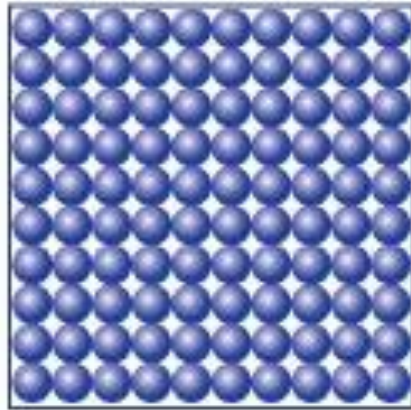
- When the reactants and products contain equal numbers of the same atom the chemical equation is balanced
- Balanced by the use of coefficients
- Coefficients are numbers written in front of chemical formulas
- They indicate number of atoms or molecules of that substance

Coefficients



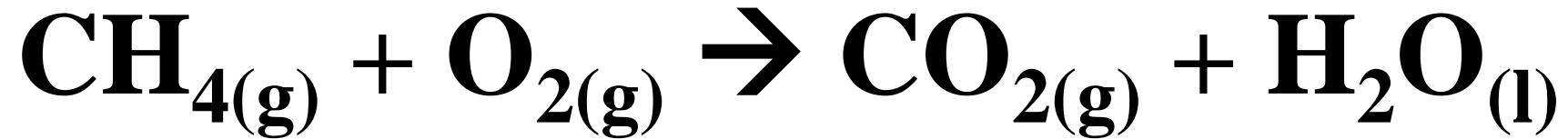
# Balanced Chemical Equation

- Physical state symbols are added to show the substance's composition
- **(s): solid**
- **(l): liquid**
- **(aq): aqueous**
- **(g): gas**



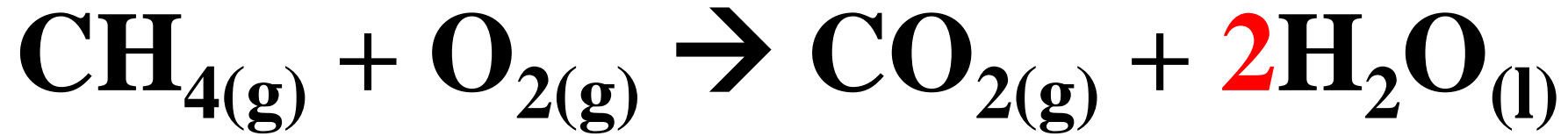


# Balancing Equations



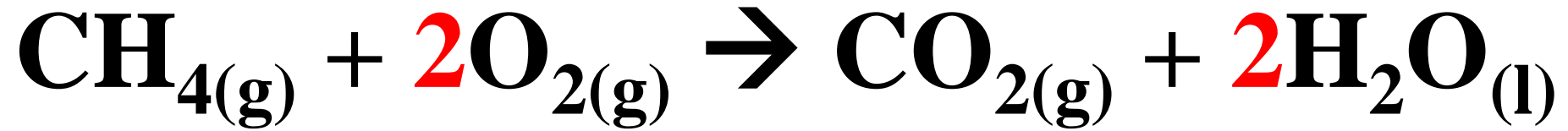
Type of atom (symbol)	Number in reactants	Number in products
<b>C</b>	<b>1</b>	<b>1</b>
<b>H</b>	<b>4</b>	<b>2</b>
<b>O</b>	<b>2</b>	<b>3</b>

# Balancing Equations



Type of atom (symbol)	Number in reactants	Number in products
<b>C</b>	<b>1</b>	<b>1</b>
<b>H</b>	<b>4</b>	<b>4</b>
<b>O</b>	<b>2</b>	<b>4</b>

# Balancing Equations



Type of atom (symbol)	Number in reactants	Number in products
C	1	1
H	4	4
O	4	4

# Balanced Chemical Equation

## General Rules:

1. Balance **metals first**
2. Balance **non-metals next (except hydrogen and oxygen)**.  
Polyatomic ions can be balanced as a group.
3. Balance **hydrogen and oxygen last**
4. Ensure that the equation is in **lowest terms**
5. Check to ensure that there are the **same number of each type of atom** before and after the reaction

# Balanced Chemical Equation

- Use **coefficients** to change the number of atoms of an element
- **Never change the subscripts**
- Some equations may take longer than others to solve (be patient)

