# Chp 20.1

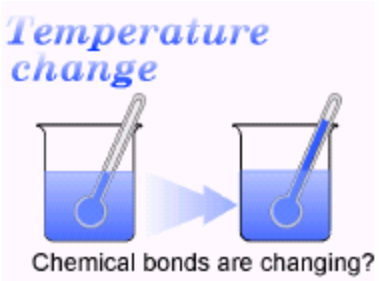
## Chemical Reactions

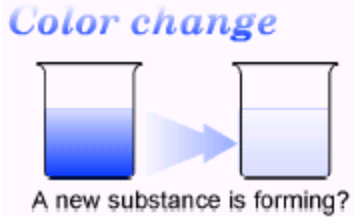
# Physical Changes

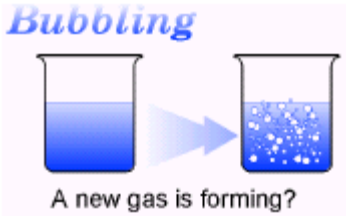
- Physical changes is a change that affects only the physical properties of a substance.
- Physical properties are size, shape, and state

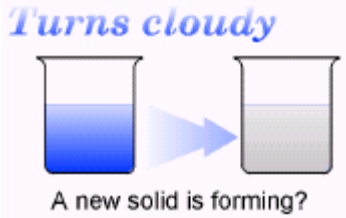
# Chemical Changes

- Chemical changes involve the breaking of bonds in one or more substances, and the reforming of new bonds to create new substances.
- Chemical changes have occurred when you get products that are different from those starting substances.



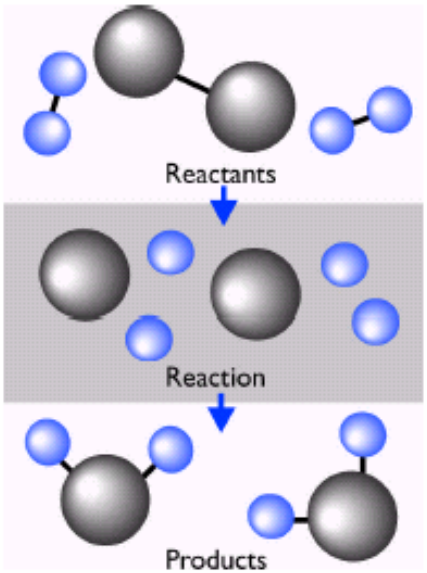
# Chemical Equations

- A chemical equation is a system using chemical formulas, words, and symbols to represent a reaction.

Methane + Oxygen ⟶ Carbon Dioxide + Water

Reactants — substances that change

Products — substances that are formed




- Reactants are the substances that enters into and is altered in a chemical reaction.
- Products are the substances that are produced in a chemical reaction.

# Diatomic Molecules

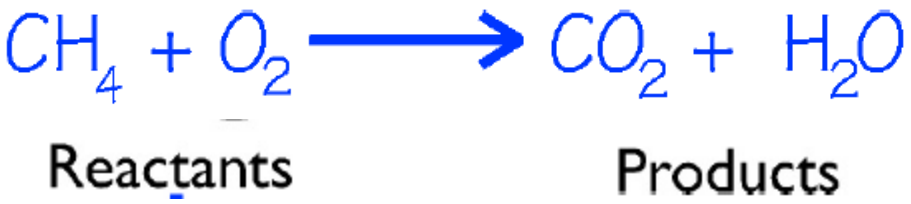
- Some elements are so reactive that they never exist as a single atom in nature. These are called the diatomic molecules.
- Whenever these atoms are written in a chemical reaction, they must ALWAYS be written as a pair.
- **IMPORTANT!!! (YOU MUST KNOW THESE)**

**$H_2$ $N_2$ $O_2$ $F_2$ $Cl_2$ $Br_2$**

# For Example

- We could write the reaction of methane and oxygen as follows:
  - Methane gas reacts with oxygen gas to produce carbon dioxide and water.

| substance | chemical formula |
|---|---|
| methane | $CH_4$ |
| oxygen | $O_2$ |
| carbon dioxide | $CO_2$ |
| water | $H_2O$ |




*** Oxygen is written as $O_2$ because it is a diatomic molecule