

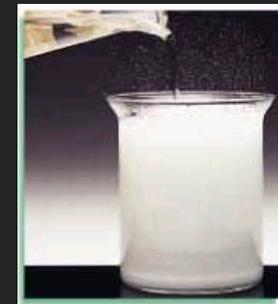


# Types of Chemical Reactions

# How can you tell if a chemical reaction occurred?

## ARE THERE ANY CHARACTERISTICS YOU MIGHT OBSERVE?

- **GAS FORMED**
- **LIGHT PRODUCED**
- **EXPLOSION**
- **TEMPERATURE CHANGED**
- **NEW ODOR PRODUCED**
- **PRECIPITATE FORMED**
- **COLOR CHANGE**



## INDICATORS OF A CHEMICAL REACTION



# Types of Reactions

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- There are five types of chemical reactions we will use:

1. **Synthesis reactions**

2. **Decomposition reactions**

3. **Single displacement reactions**

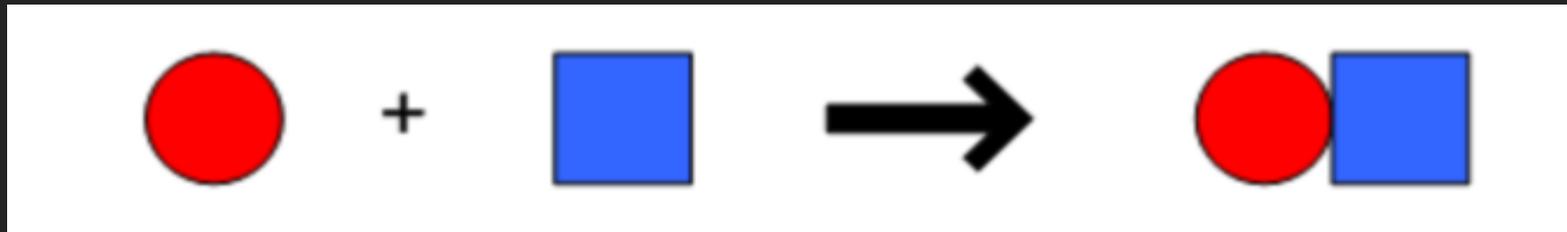
4. **Double displacement reactions**

5. **Combustion reactions**

# 1. Synthesis reactions

## DESCRIPTION:

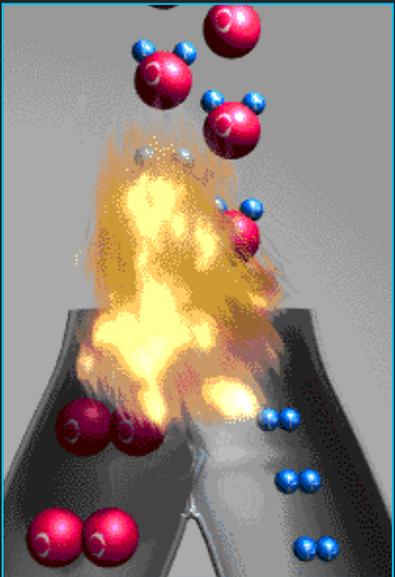
- Synthesis reactions occur when two simple substances combine and form a single compound



# 1. Synthesis reactions

## GENERAL FORMULA:

- reactant + reactant → product
- $A + B \rightarrow AB$



Forming  
water

## EXAMPLES:

- FORMATION OF WATER



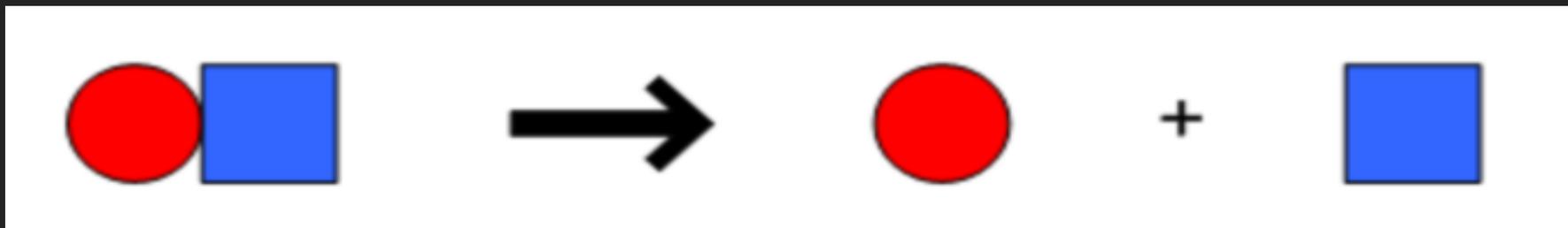
- FORMATION OF CARBON DIOXIDE



# 1. Decomposition reactions

## DESCRIPTION:

- **Decomposition reactions** are opposite of synthesis reactions. They occur when a compound breaks up into simpler compounds



# 2. Decomposition reactions

## GENERAL FORMULA:

- Product  $\rightarrow$  reactant + reactant
- $AB \rightarrow A + B$

## EXAMPLES:

- DECOMP OF WATER



- DECOMP OF HgO



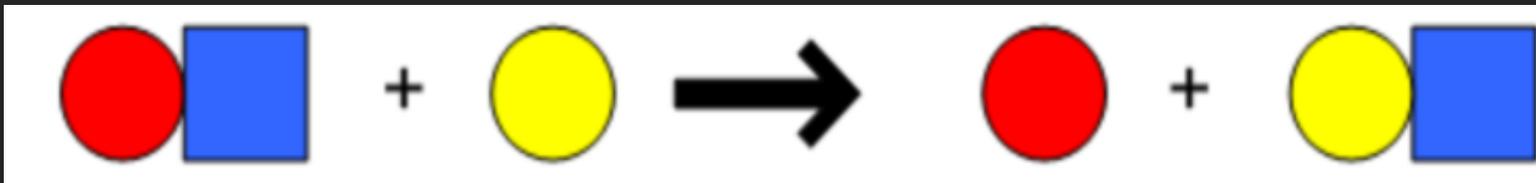
**Decomposition  
Reactions**

**The opposite of a Synthesis reactions**

# 3. Single Replacement Reactions

## DESCRIPTION:

- Single Replacement Reactions occur when one element replaces another in a compound

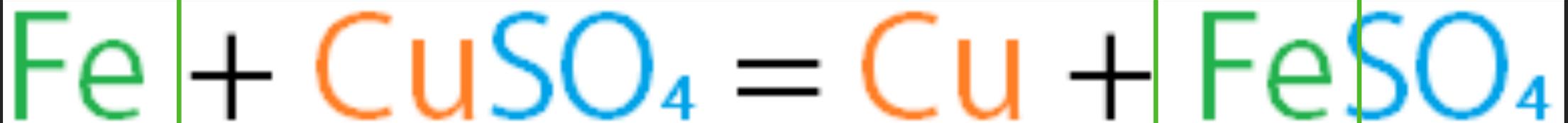


A replaced  
B on the  
product  
side to  
form AC  
and B ends  
up alone

## 2. Single Replacement reactions

### GENERAL FORMULA: EXAMPLES:

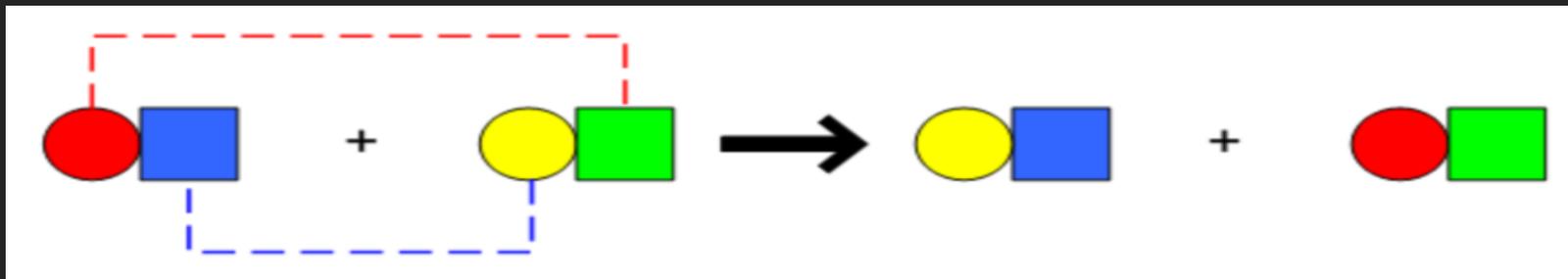
- element + compound  $\rightarrow$  compound + element
- $A + BC \rightarrow AC + B$
- $A + BC \rightarrow BA + C$
- $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$
- $Mg + 2 HCl \rightarrow MgCl_2 + H_2$



# 4. Double Replacement Reactions

- **DESCRIPTION:**

Double Replacement Reactions occur when a metal replaces a metal in a compound and a nonmetal replaces a nonmetal in a compound forming two NEW COMPOUNDS



# 4. Double Replacement Reactions

## GENERAL FORMULA:

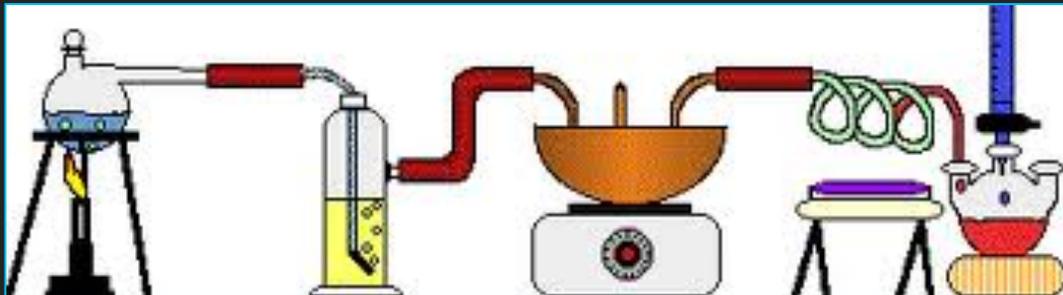
- compound + compound → compound + compound

- AB + CD → AD + CB

## EXAMPLES:

- Think about it like “foil”ing in algebra

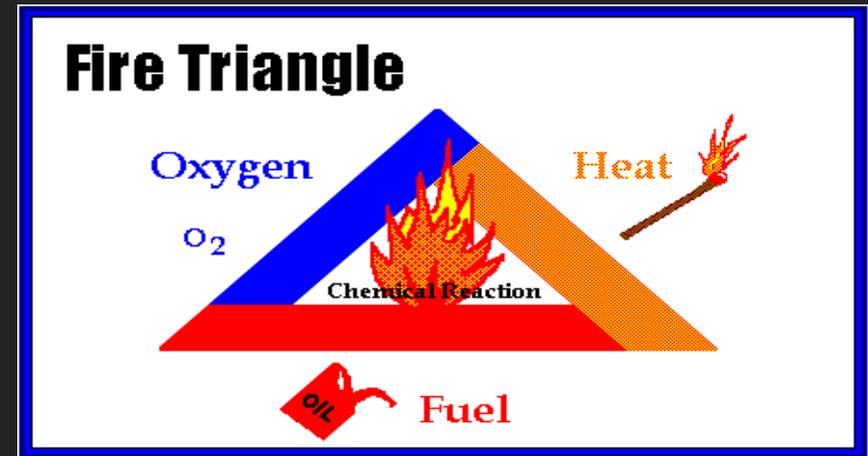
- Examples:



# 5. Combustion Reactions

- **DESCRIPTION:**

Combustion reactions occur when a hydrocarbon reacts with **oxygen gas** to produce **carbon dioxide** and **water**



# 5. Combustion Reactions

**GENERAL FORMULA:**      **EXAMPLES:**

• Basically:



# Identifying Chemical Reactions

Use colored pencils to circle the common atoms or compounds in each equation to help you determine the type of reaction it illustrates. Use the code below to classify each reaction.

S = Synthesis

D = Decomposition

SR = Single Replacement

DR = Double Replacement



**SYNTHESIS**

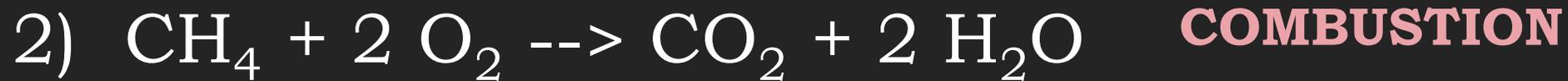
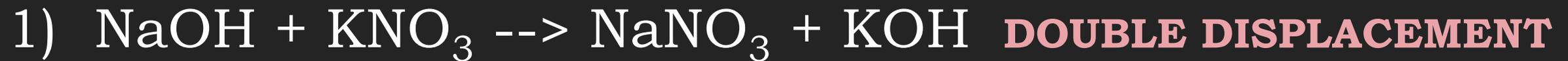


Compare to your notes

**SYNTHESIS**

# Pair Share Activity

**Classify the following types of reactions:**

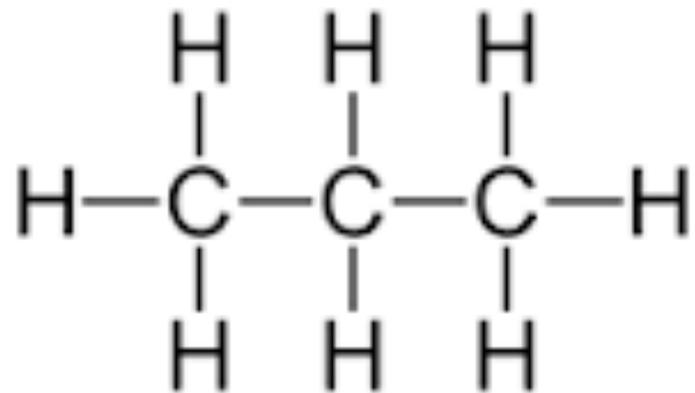


# Naming Organic Compounds

- Organic compounds contain carbon and have a different system.
- The simplest group of organic compounds is the hydrocarbons which contain carbon and hydrogen
- The “stem” of the name is determined by the number of carbon atoms. The ending of the names is the same and will be **-ane**.
- Compounds can be written using structural formulas
- Hydrocarbons can also come in ring shaped structures. The name “cyclo” must be added before the “stem”

<b>FORMULA</b>	<b># of Carbon atoms</b>	<b>STEM</b>	<b>Ending</b>	<b>Full Name</b>
<b>CH<sub>4</sub></b>	<b>1</b>	<b>Meth</b>	<b>-ane</b>	<b>Methane</b>
<b>C<sub>2</sub>H<sub>6</sub></b>	<b>2</b>	<b>Eth</b>	<b>ane</b>	<b>Ethane</b>
<b>C<sub>3</sub>H<sub>8</sub></b>	<b>3</b>	<b>Prop</b>	<b>ane</b>	<b>Propane</b>
<b>C<sub>4</sub>H<sub>10</sub></b>	<b>4</b>	<b>But</b>	<b>ane</b>	<b>Butane</b>
<b>C<sub>5</sub>H<sub>12</sub></b>	<b>5</b>	<b>Pent</b>	<b>ane</b>	<b>Pentane</b>
<b>C<sub>6</sub>H<sub>14</sub></b>	<b>6</b>	<b>Hex</b>	<b>ane</b>	<b>Hexane</b>
<b>C<sub>7</sub>H<sub>16</sub></b>	<b>7</b>	<b>Hept</b>	<b>ane</b>	<b>Heptane</b>
<b>C<sub>8</sub>H<sub>18</sub></b>	<b>8</b>	<b>Oct</b>	<b>ane</b>	<b>Octane</b>
<b>C<sub>9</sub>H<sub>20</sub></b>	<b>9</b>	<b>Non</b>	<b>ane</b>	<b>Nonane</b>
<b>C<sub>10</sub>H<sub>22</sub></b>	<b>10</b>	<b>Dec</b>	<b>ane</b>	<b>Decane</b>

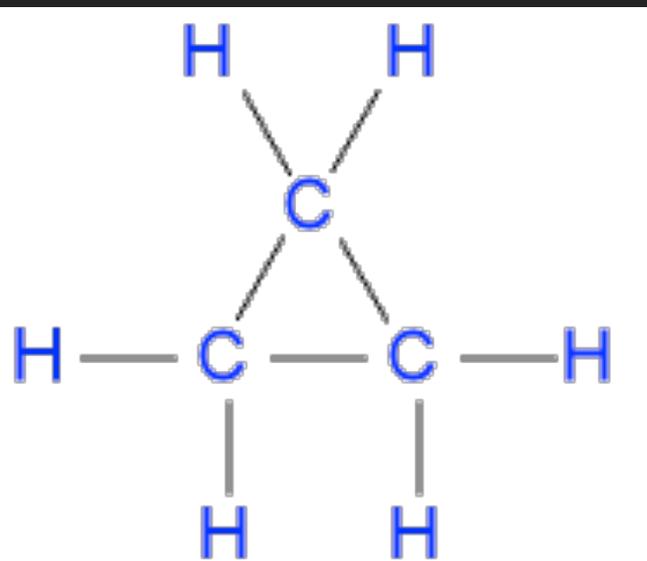
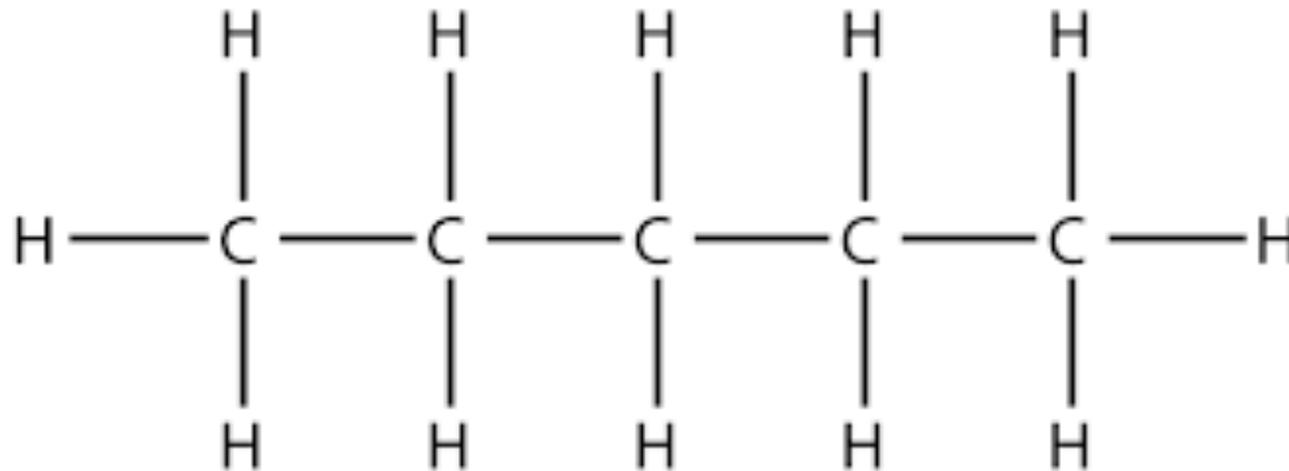
# Examples



PROPANE



PENTANE



CYCLOPROPANE