How do you classify types of reaction?

- Combination (Synthesis) reaction.
- Decomposition reaction.
- Displacement reaction.
- Double displacement reaction.

How can you identify a chemical reaction?

- Change in Temperature.
- Change in Color.
- Noticeable Odor. ...
- Formation of a Precipitate. ...
- Formation of Bubbles.

A chemical reaction is a process generally characterized by a chemical change in which the starting materials (reactants) are different from the products. Chemical reactions tend to involve the motion of electrons, leading to the formation and breaking of chemical bonds. There are several different types of chemical reactions and more than one way of classifying them. Here are some common reaction types:

1. Direct Combination or Synthesis Reaction

In a synthesis reaction, two or more chemical species combine to form a more complex product.

$A + B \rightarrow AB$

The combination of iron and sulfur to form iron (II) sulfide is an example of a synthesis reaction:

$8\ Fe + S_8 \rightarrow 8\ FeS$

2. Chemical Decomposition or Analysis Reaction

In a decomposition reaction, a compound is broken into smaller chemical species.

$AB \rightarrow A + B$

The electrolysis of water into oxygen and hydrogen gas is an example of a decomposition reaction:

$2\ H_2O \rightarrow 2\ H_2 + O_2$

3. Single Displacement or Substitution Reaction

A substitution or single displacement reaction is characterized by one element being displaced from a compound by another element.

$A + BC \rightarrow AC + B$

An example of a substitution reaction occurs when zinc combines with hydrochloric acid. The zinc replaces the hydrogen:

$Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$

4. Metathesis or Double Displacement Reaction

In a double displacement or metathesis reaction two compounds exchange bonds or ions in order to form different compounds.

$AB + CD \rightarrow AD + CB$

An example of a double displacement reaction occurs between sodium chloride and silver nitrate to form sodium nitrate and silver chloride.

$NaCl(aq) + AgNO_3(aq) \rightarrow NaNO_3(aq) + AgCl(s)$