

Making Predictions Using the Types of Reactions

The 5 general reactions (synthesis, decomposition, single displacement, double displacement, combustion) can occur between elements and compounds. Classify each using the 5 types of reactions.

1) metal + non-metal \longrightarrow ionic compound _____

2) non-metal + non-metal \longrightarrow molecular compound _____

3) ionic compound \longrightarrow metal + non-metal _____

4) molecular compound \longrightarrow non-metal + non-metal _____

5) metal 1 + ionic compound 1 \longrightarrow metal 2 + ionic compound 2 _____

6) ionic compound 1 + non-metal 1 \longrightarrow ionic compound 2 + non-metal 2 _____

7) ionic compound 1 + ionic compound 2 \longrightarrow ionic compound 3 + ionic compound 4 _____

8) hydrocarbon + oxygen \longrightarrow carbon dioxide + water _____

9) metal + oxygen \longrightarrow metal oxide _____

Questions:

1. Using the general reaction types:

- Identify the type of reaction using the list above as a guideline.
- Predict the name of the product(s) formed in the reaction.
- Write the balanced chemical equation (BCE) for the reaction.

a) iron + aluminum sulfate \longrightarrow
BCE:

b) sodium + iodine \longrightarrow
BCE:

c) aluminum chloride \longrightarrow

BCE:

d) fluorine + potassium oxide \longrightarrow

BCE:

2. For each of these reactions:

i) Identify the type of reaction.

ii) Complete the skeleton equation. *Hint: use the list to guide you.*

iii) Balance the equation.

a) $\text{NaOH} + \text{Cu}(\text{NO}_3)_2 \longrightarrow$

b) $\text{C}_2\text{H}_2 + \text{O}_2 \longrightarrow$

c) $\text{H}_2\text{O} \longrightarrow$

d) $\text{Ag}_2\text{O} \longrightarrow$

e) $\text{PbSO}_4 + \text{KOH} \longrightarrow$

f) $\text{Al} + \text{KCl} \longrightarrow$

3. In cars, several reactions take place when an airbag inflates in an accident. Using your knowledge of types of reactions, complete balanced equations for each of the 3 reactions.

Reaction 1: Sodium azide (NaN_3) undergoes a decomposition reaction to produce an alkali metal and a common gas.

Reaction 2: The dangerous metal produced in reaction 1 is removed by a single displacement reaction with iron (III) oxide.

Reaction 3: The metal oxide produced in reaction 2 combines with carbon dioxide and water in a synthesis reaction to create sodium bicarbonate.