Types of Chemical Reactions

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- 1. Synthesis reactions
- 2. Decomposition reactions
- 3. Single displacement reactions
- 4. Double displacement reactions
- 5. Combustion reactions
- 6. Redox Reactions

According to your Performance Standards, you need to be able to identify each type.

Let us first understand each type of reactions

Watch the movie and then complete the chart.



Reaction	Definition	★ Equation
Synthesis	Two or more elements or compounds combine to make a more complex substance	$\begin{array}{c} A + B \rightarrow AB \\ \bullet + \bullet \rightarrow \bullet \bullet \bullet \end{array}$
Decomposition	Compounds break down into simpler substances	$AB \rightarrow A + B$
Single Replacement	Occurs when one element replaces another one in a compound	$AB + C \rightarrow AC + E$ $00 + 0 \rightarrow 00 + 0$
Double Replacement	Occurs when different atoms in two different compounds trade places	AB + CD → AB + CD → + ○ → + ○

Combustion Reaction

The burning of carbon or carbon compounds to give carbon dioxide and water. Note: You will get only carbon dioxide when carbon burns; No water will be formed.

$$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$$

$$CH_{4(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(I)}$$

Redox Reaction

Reaction between two cations

The ion with higher charge becomes an ion with smaller charge (Reduction); the ion with smaller charge becomes an ion with higher charge (Oxidation)

$$Fe^{2+} \rightarrow Fe^{3+} + e^{-}$$
 (oxidation half - reaction)
 $Ce^{4+} + e^{-} \rightarrow Ce^{3+}$ (reduction half - reaction)
 $Fe^{2+} + Ce^{4+} \rightarrow Fe^{3+} + Ce^{3+}$ (Overall reaction)

Identify the Types of Chemical Reaction in each of the following

Balance the reactions **1 to 6** and indicate which type of chemical reaction (synthesis, decomposition, single-displacement, double-displacement or combustion) is being represented:

1. ____ NaBr + ___ Ca(OH)₂
$$\rightarrow$$
 ___ CaBr₂ + ___ NaOH Reaction Type : ____

1. ____
$$NH_3+$$
 ____ $H_2SO_4 \rightarrow$ ____ $(NH_4)_2SO_4$ Reaction Type : _____

1. ____
$$C_5H_9O +$$
 ____ $O_2 \rightarrow$ ____ $CO_2 +$ ___ H_2O Reaction Type : ____

1. ____ Pb + ___
$$H_3PO_4 \rightarrow$$
 ___ H_2 + ___ Pb₃(PO₄)₂ Reaction Type : ____

1. ____ Li₃N + ___ NH₄NO₃
$$\rightarrow$$
 ___ LiNO₃ + ___ (NH₄)₃N Reaction Type : ____

1. ____ HBr + ___ Al(OH)₃
$$\rightarrow$$
 ___ H₂O + ___ AlBr₃ Reaction Type : ____

Indicate which type of chemical reaction (synthesis, decomposition, single-displacement, double-displacement or combustion) is being represented in 7 to 20.

$Na_3PO_4 + 3 KOH \rightarrow 3 NaOH + K_3PO_4$	Reaction Type
MgCl₂ + Li₂CO₃ → MgCO₃ + 2 LiCl	Reaction Type
$C_6H_{12} + 9 O_2 \rightarrow 6 CO_2 + 6 H_2O$	Reaction Type
Pb + FeSO ₄ \rightarrow PbSO ₄ + Fe	Reaction Type
CaCO ₃ → CaO + CO ₂	Reaction Type
$P_4 + 3 O_2 \rightarrow 2 P_2 O_3$	Reaction Type
2 RbNO ₃ + BeF ₂ \rightarrow Be(NO ₃) ₂ + 2 RbF	Reaction Type
2 AgNO ₃ + Cu → Cu(NO ₃) ₂ + 2 Ag	Reaction Type
$C_3H_6O + 4 O_2 \rightarrow 3 CO_2 + 3 H_2O$	Reaction Type
$2 C_5H_5 + Fe \rightarrow Fe(C_5H_5)_2$	Reaction Type
$SeCl_6 + O_2 \rightarrow SeO_2 + 3Cl_2$	Reaction Type
2 MgI ₂ + Mn(SO ₃) ₂ \rightarrow 2 MgSO ₃ + MnI ₄	Reaction Type
$O_3 \rightarrow O_1 + O_2$	Reaction Type
$2 NO_2 \rightarrow 2 O_2 + N_2$	Reaction Type