

Key

Worksheet: Writing and Balancing Chemical Reactions

1. Balance the following equations and indicate the type of reaction as formation, decomposition, single replacement, double replacement, hydrocarbon combustion, or other.

- $\underline{2} \text{ Cu}_{(s)} + \underline{\quad} \text{O}_{2(g)} \rightarrow \underline{2} \text{ CuO}_{(s)}$
- $\underline{2} \text{ H}_2\text{O}_{(l)} \rightarrow \underline{2} \text{ H}_{2(g)} + \underline{\quad} \text{O}_{2(g)}$
- $\underline{3} \text{ Fe}_{(s)} + \underline{4} \text{ H}_2\text{O}_{(g)} \rightarrow \underline{4} \text{ H}_{2(g)} + \underline{\quad} \text{Fe}_3\text{O}_{4(s)}$
- $\underline{2} \text{ AsCl}_{3(aq)} + \underline{3} \text{ H}_2\text{S}_{(aq)} \rightarrow \underline{\quad} \text{As}_2\text{S}_{3(s)} + \underline{6} \text{ HCl}_{(aq)}$
- $\underline{\quad} \text{CuSO}_4 \cdot 5 \text{ H}_2\text{O}_{(s)} \rightarrow \underline{\quad} \text{CuSO}_{4(s)} + \underline{5} \text{ H}_2\text{O}_{(g)}$
- $\underline{\quad} \text{Fe}_2\text{O}_{3(s)} + \underline{3} \text{ H}_{2(g)} \rightarrow \underline{2} \text{ Fe}_{(s)} + \underline{3} \text{ H}_2\text{O}_{(l)}$
- $\underline{\quad} \text{CaCO}_{3(s)} \rightarrow \underline{\quad} \text{CaO}_{(s)} + \underline{\quad} \text{CO}_{2(g)}$
- $\underline{8} \text{ Fe}_{(s)} + \underline{\quad} \text{S}_{8(s)} \rightarrow \underline{8} \text{ FeS}_{(s)}$
- $\underline{\quad} \text{H}_2\text{S}_{(aq)} + \underline{2} \text{ KOH}_{(aq)} \rightarrow \underline{2} \text{ H}_2\text{O}_{(l)} + \underline{\quad} \text{K}_2\text{S}_{(aq)}$
- $\underline{2} \text{ NaCl}_{(l)} \rightarrow \underline{2} \text{ Na}_{(l)} + \underline{\quad} \text{Cl}_{2(g)}$
- $\underline{2} \text{ Al}_{(s)} + \underline{3} \text{ H}_2\text{SO}_{4(aq)} \rightarrow \underline{2} \text{ H}_{2(g)} + \underline{\quad} \text{Al}_2(\text{SO}_4)_{3(aq)}$
- $\underline{\quad} \text{H}_3\text{PO}_{4(aq)} + \underline{3} \text{ NH}_4\text{OH}_{(aq)} \rightarrow \underline{3} \text{ H}_2\text{O}_{(l)} + \underline{\quad} (\text{NH}_4)_3\text{PO}_{4(aq)}$
- $\underline{\quad} \text{C}_3\text{H}_8_{(g)} + \underline{5} \text{ O}_{2(g)} \rightarrow \underline{3} \text{ CO}_{2(g)} + \underline{4} \text{ H}_2\text{O}_{(l)}$
- $\underline{4} \text{ Al}_{(s)} + \underline{3} \text{ O}_{2(g)} \rightarrow \underline{2} \text{ Al}_2\text{O}_{3(s)}$
- $\underline{\quad} \text{CH}_4_{(g)} + \underline{2} \text{ O}_{2(g)} \rightarrow \underline{\quad} \text{CO}_{2(g)} + \underline{2} \text{ H}_2\text{O}_{(l)}$
- $\underline{\quad} \text{K}_2\text{SO}_{4(aq)} + \underline{\quad} \text{BaCl}_{2(aq)} \rightarrow \underline{2} \text{ KCl}_{(aq)} + \underline{\quad} \text{BaSO}_{4(s)}$
- $\underline{\quad} \text{C}_5\text{H}_{12(l)} + \underline{8} \text{ O}_{2(g)} \rightarrow \underline{5} \text{ CO}_{2(g)} + \underline{6} \text{ H}_2\text{O}_{(g)}$
- $\underline{\quad} \text{Ca}(\text{OH})_{2(aq)} + \underline{2} \text{ NH}_4\text{Cl}_{(aq)} \rightarrow \underline{2} \text{ NH}_4\text{OH}_{(aq)} + \underline{\quad} \text{CaCl}_{2(aq)}$
- $\underline{\quad} \text{V}_2\text{O}_5_{(s)} + \underline{5} \text{ Ca}_{(s)} \rightarrow \underline{5} \text{ CaO}_{(s)} + \underline{\quad} \text{V}_{(s)}$
- $\underline{2} \text{ Na}_{(s)} + \underline{\quad} \text{ZnI}_{2(aq)} \rightarrow \underline{2} \text{ NaI}_{(aq)} + \underline{\quad} \text{Zn}_{(s)}$
- $\underline{\quad} \text{C}_7\text{H}_6\text{O}_3_{(l)} + \underline{7} \text{ O}_{2(g)} \rightarrow \underline{7} \text{ CO}_{2(g)} + \underline{3} \text{ H}_2\text{O}_{(l)}$
- $\underline{3} \text{ Ca}_{(s)} + \underline{\quad} \text{N}_{2(g)} \rightarrow \underline{\quad} \text{Ca}_3\text{N}_{2(s)}$
- $\underline{\quad} \text{Fe}_2\text{O}_{3(s)} + \underline{3} \text{ H}_{2(g)} \rightarrow \underline{2} \text{ Fe}_{(s)} + \underline{3} \text{ H}_2\text{O}_{(l)}$
- $\underline{2} \text{ C}_{15}\text{H}_{30(l)} + \underline{45} \text{ O}_{2(g)} \rightarrow \underline{30} \text{ CO}_{2(g)} + \underline{30} \text{ H}_2\text{O}_{(g)}$
- $\underline{2} \text{ BN}_{(s)} + \underline{3} \text{ F}_{2(g)} \rightarrow \underline{2} \text{ BF}_{3(s)} + \underline{\quad} \text{N}_{2(g)}$
- $\underline{2} \text{ C}_{12}\text{H}_{26(l)} + \underline{37} \text{ O}_{2(g)} \rightarrow \underline{24} \text{ CO}_{2(g)} + \underline{26} \text{ H}_2\text{O}_{(g)}$

2. Predict the product(s) along with the states, indicate the type of reaction, and balance the following chemical reactions.

- A solution of lead (II) nitrate is mixed with a solution of sodium iodide.
- Solid zinc sulfide reacts with oxygen in the air.
- Liquid butane ($\text{C}_4\text{H}_{10(l)}$) is used as a fuel to ignite a lighter.
- Barium hydroxide solution is neutralized by adding hydrochloric acid ($\text{HCl}_{(aq)}$).
- Copper metal is placed in a solution of silver nitrate.
- Sulfur burns in oxygen to make sulfur dioxide gas.
- A solution of aluminum sulfate is mixed with a solution of calcium hydroxide.
- Zinc metal is placed in sulfuric acid ($\text{H}_2\text{SO}_{4(aq)}$).
- Aluminum powder is placed in a container filled with chlorine gas.
- Sucrose undergoes cellular respiration.