

Key

## Predicting Products of Chemical Reactions

This worksheet is designed to help you predict products of simple reactions of the four basic reaction types (synthesis, decomposition, single replacement, and double replacement) and combustion reactions.

For the first few reactions, the type of reaction is listed, you should predict the products, then balance. Further questions just have the reactants listed and you should decide on the type of reaction, as well as the correct products. Many of these reactions fall into the category of redox reactions, though do not let that confuse you...each can be described in terms of the four basic reaction types (except the combustion reactions).

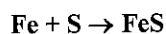
Although states (s, l, g, aq) of the reactants and products are very important in a chemical reaction, don't worry about determining those for these problems. Rather, focus on what products might result from the reactants given. Pay particular attention to the ionic charge of species that you know form ions with only one possible charge (e.g., alkali metals, alkaline earth metals, halogens, etc.)

1. Synthesis:  $\text{Mg} + \text{I}_2 \rightarrow \text{MgI}_2$
2. Double displacement:  $\text{CuCl}_2 + \text{H}_2\text{S} \rightarrow \text{CuS} + \underline{2}\text{HCl}$
3. Double displacement:  $\text{NaOH} + \text{HClO}_4 \rightarrow \text{NaClO}_4 + \text{H}_2\text{O}$
4. Decomposition:  $\text{ZnCO}_3 + \text{heat} \rightarrow \text{ZnO} + \text{CO}_2$
5. Single replacement:  $\underline{2}\text{HCl} + \text{Zn} \rightarrow \text{H}_2 + \text{ZnCl}_2$
6. Single:  $\underline{2}\text{Na} + \text{MgCl}_2 \rightarrow \underline{2}\text{NaCl} + \text{Mg}$
7. Double:  $\text{CaCl}_2 + \text{K}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + \underline{2}\text{KCl}$
8. Syn:  $\underline{2}\text{K} + \text{Cl}_2 \rightarrow \underline{2}\text{KCl}$
9. Double:  $\underline{3}\text{BaCl}_2 + \underline{2}\text{K}_3\text{PO}_4 \rightarrow \text{Ba}_3(\text{PO}_4)_2 + \underline{6}\text{KCl}$
10. Double:  $\text{H}_2\text{SO}_4 + \underline{2}\text{KOH} \rightarrow \underline{2}\text{H}_2\text{O} + \text{K}_2\text{SO}_4$
11. Decomp:  $\text{Al}_2(\text{CO}_3)_3 + \text{heat} \rightarrow \text{Al}_2\text{O}_3 + \underline{3}\text{CO}_2$
12. Syn:  $\underline{4}\text{Al} + \underline{3}\text{O}_2 \rightarrow \underline{2}\text{Al}_2\text{O}_3$
13. Double:  $\text{Pb}(\text{NO}_3)_2 + \underline{2}\text{KOH} \rightarrow \text{Pb}(\text{OH})_2 + \underline{2}\text{KNO}_3$
14. Double:  $\text{H}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \underline{2}\text{HCl} + \text{BaSO}_4$
15. Single:  $\text{Ca} + \underline{2}\text{AgCl} \rightarrow \text{CaCl}_2 + \underline{2}\text{Ag}$
16. Double:  $\text{H}_3\text{PO}_4 + \text{FeBr}_3 \rightarrow \underline{3}\text{HBr} + \text{FePO}_4$
17. Syn:  $\underline{6}\text{Li} + \text{N}_2 \rightarrow \underline{2}\text{Li}_3\text{N}$
18. Double:  $\underline{2}\text{HCl} + \text{Mg}(\text{OH})_2 \rightarrow \underline{2}\text{H}_2\text{O} + \text{MgCl}_2$
19. Decomp:  $\text{Mg}(\text{OH})_2 + \text{heat} \rightarrow \text{MgO} + \text{H}_2\text{O}$
20. Decomp:  $\underline{2}\text{Fe}(\text{OH})_3 + \text{heat} \rightarrow \text{Fe}_2\text{O}_3 + \underline{3}\text{H}_2\text{O}$

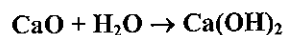
**Convert each of the following word equations to formula equations.**

**You DO NOT have to balance the equations. You DO have to write correct chemical formulas.**

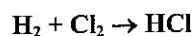
1. Iron reacts with sulfur to produce iron (II) sulfide



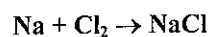
2. Calcium oxide reacts with water to produce calcium hydroxide



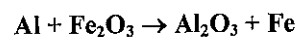
3. Hydrogen reacts with chlorine to form hydrochloric acid



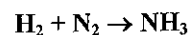
4. Sodium reacts with chlorine to produce sodium chloride



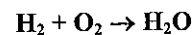
5. Aluminum reacts with iron (III) oxide to produce aluminum oxide and iron



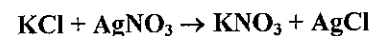
6. Hydrogen reacts with nitrogen to produce ammonia (NH<sub>3</sub>)



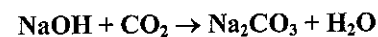
7. Hydrogen reacts with oxygen to produce water



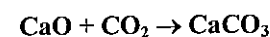
8. Potassium chloride reacts with silver nitrate to form potassium nitrate and silver chloride



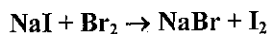
9. Sodium hydroxide reacts with carbon dioxide to produce sodium carbonate and water



10. Calcium oxide reacts with carbon dioxide to produce calcium carbonate



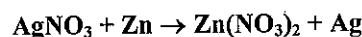
11. Sodium iodide reacts with bromine to produce sodium bromide and iodine



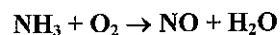
12. Hydrobromic acid reacts with oxygen to produce water and bromine



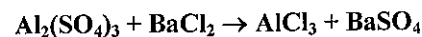
13. Silver nitrate reacts with zinc to produce zinc nitrate and silver



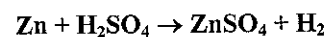
14. Ammonia reacts with oxygen to produce nitrogen monoxide and water



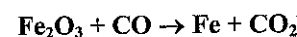
15. Aluminum sulfate reacts with barium chloride to produce aluminum chloride and barium sulfate



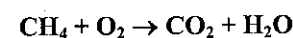
16. Zinc reacts with sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) to produce zinc sulfate and hydrogen



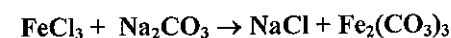
17. Iron (III) oxide reacts with carbon monoxide to produce iron and carbon dioxide



18. Methane (CH<sub>4</sub>) reacts with oxygen to form carbon dioxide and water



19. Iron (III) chloride reacts with sodium carbonate to produce sodium chloride and iron (III) carbonate



20. Butane (C<sub>2</sub>H<sub>6</sub>) reacts with oxygen to form carbon dioxide and water

