Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_

**Writing Equations and Types of Reactions**

**Rules for Classifying and Predicting Reactions:**

|  |  |  |
| --- | --- | --- |
| **Type of Reaction** | **Description** | **Formula and Example** |
| **Double Displacement Reaction** | Two similar ions in compounds displace each other to produce two new compounds (compounds are ionic or acids) | AX + BY 🡪 AY + BX  AgNO3(aq)+ NaCl(aq)🡪 AgCl(s) + NaNO3(aq) |
| **Single Displacement Reaction** | One element in a compound is displaced by a more reactive pure element | A + BX 🡪 AX + B  Zn + 2 HCl 🡪 ZnCl2 + H2 |
| **Composition**  **Reaction**  **(Synthesis)** | Two or more substances combine to form one product | A + B 🡪 AB  2Na + Cl2 🡪 2NaCl |
| **Decomposition Reaction** | One reactant (compound) is broken down to form two or more products (usually elements) | AB 🡪 A + B  2NaCl 🡪 2Na + Cl2 |
| **Combustion Reaction** | A hydrocarbon is burned in the presence of oxygen to produce carbon dioxide and water | CxHy + O2 🡪 CO2 + H2O  C3H8  + 5 O2 🡪 3 CO2 + 4 H2O |

**DOUBLE DISPLACEMENT**: Write the balanced equation below:

1. silver nitrate + zinc chloride → silver chloride + zinc nitrate
2. iron (II) sulfate + ammonium sulfide → iron (II) sulfide + ammonium sulfate

Predict the products and complete the balanced equation.

1. Al(NO3)3(aq) + K3PO4(aq) →
2. H2SO4(aq) + LiOH(aq) →
3. CaCl2(aq) + Li2CO3(aq) →
4. Ba(OH)2(aq) + H2SO4(aq) →

**SINGLE DISPLACEMENT**: Write the balanced equation below:

1. aluminum + sulfuric acid (H2SO4) → aluminum sulfate + hydrogen gas
2. iron + copper (II) nitrate → iron (II) nitrate + copper

Predict the products and complete the balanced equation.

1. Mg(s) + Al2O3(s) →
2. Cl2(g) + HBr(aq) →
3. Cu(NO3)2(aq) + Ag(s) →
4. Zn(s) + HCl(aq) →

**COMPOSITION REACTIONS:** Write the balanced equation for the reactions below.

1. carbon + oxygen → carbon monoxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. hydrogen + oxygen → water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the products and complete the balanced equation.

1. Na + Cl2 →
2. K + O2 →
3. magnesium + iodine
4. aluminum + bromine

**DECOMPOSITION REACTIONS:** Write the balanced equation below.

1. iron (II) chloride → iron + chlorine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. silver fluoride → silver + fluorine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the products and complete the balanced equation.

1. Al2O3 →
2. MgCl2 →
3. sodium nitride →
4. NH3 →

**COMBUSTION**: Write the balanced equation below.

1. C3H8 + oxygen → carbon dioxide + water
2. C2H5OH + oxygen → carbon dioxide + water

Predict the products and complete the balanced equation.

1. CH4 + O2 →
2. C3H6 + O2 →
3. C3H6O + O2 →
4. C6H14 + O2 →

Write the products and balance the following equations. Identify the type of reaction as composition (C), decomposition (D), combustion (COMB), single displacement (SD), double displacement (DD).

Write (s) or (aq) on products of double displacement.

Equation Type

1. \_\_\_\_ AgNO3 + \_\_\_\_ CaCl2 🡪 \_\_\_\_\_\_
2. \_\_\_\_ C2H4 + \_\_\_\_ O2 🡪 \_\_\_\_\_\_
3. \_\_\_\_ Pb(NO3)2 + \_\_\_\_ HCl 🡪 \_\_\_\_\_\_
4. \_\_\_\_ Fe2O3 + \_\_\_\_ Ca 🡪 \_\_\_\_\_\_
5. \_\_\_\_ H2SO4 + \_\_\_\_ Fe (II) 🡪 \_\_\_\_\_\_
6. \_\_\_\_ CaO 🡪 \_\_\_\_\_\_
7. \_\_\_\_ FeSO4 + \_\_\_\_ Sr(NO3)2 🡪 \_\_\_\_\_\_
8. \_\_\_\_ Mg + \_\_\_\_ N2 🡪 \_\_\_\_\_\_
9. \_\_\_\_ AlCl3 🡪 \_\_\_\_\_\_
10. \_\_\_\_ CH2O + \_\_\_\_ O2 🡪 \_\_\_\_\_\_