

Name \_\_\_\_\_  
Chemistry \_\_\_\_\_

Date \_\_\_\_\_  
Aversano/Herz \_\_\_\_\_

## Student Study Guide for Chemical Reactions Test

Directions: Use your notes and chemistry reference table to help you complete this study guide.

### Key Topics to Study

## Types of Reactions

### 1. Synthesis Reaction

- Two or more substances combine to form a single product.
- General Formula:  $A + B \rightarrow AB$
- Example: \_\_\_\_\_

### 2. Decomposition Reaction

- A single compound breaks down into two or more products.
- General Formula:  $AB \rightarrow A + B$
- Example: \_\_\_\_\_

### 3. Single Replacement Reaction

- One element replaces another in a compound.
- General Formula:  $A + BC \rightarrow AC + B$
- Example: \_\_\_\_\_

### 4. Double Replacement Reaction

- The ions of two compounds exchange places in an aqueous solution.
- General Formula:  $AB + CD \rightarrow AD + CB$
- Example: \_\_\_\_\_

5. Combustion Reaction

- A hydrocarbon reacts with oxygen to produce carbon dioxide and water.
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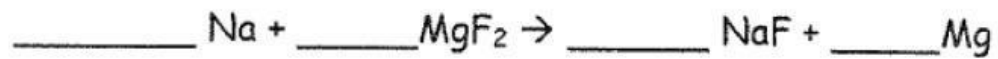
Practice Questions:

1. Classify the reaction:  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$

2. Identify the reaction type:  $\text{CuCO}_3 \longrightarrow \text{CuO} + \text{CO}_2$

3. Identify the reaction type:  $\text{H}_2 + \text{N}_2 \longrightarrow \text{NH}_3$

4. Balance and classify the reaction:



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## Formula Writing and Naming

- Ionic Compounds:
  - Combine cation (positive ion) and anion (negative ion).
  - Use Roman numerals for transition metals to indicate charge.
  - Example: = Iron (III) chloride.

Practice Questions:

1. Name: Sodium Sulfate

2. Write the formula for nitrogen oxide.

3. Write the formula Copper (II) Nitrate.

4. Write the formula for sulfur fluoride

5. Name:  $\text{KClO}_3$

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## Empirical Formula

- The simplest whole-number ratio of elements in a compound.
- Steps to Determine:
  1. Convert mass (or %) to moles.
  2. Divide by the smallest number of moles.
  3. Multiply to get whole numbers if necessary.

Practice Questions:

1. Determine the empirical formula for  $\text{N}_4\text{O}_6$

2. Determine the empirical formula for  $C_9H_{18}$

## Mass Percent

- The percentage by mass of an element in a compound.

- Formula: \_\_\_\_\_

Example:

- Find the mass % of hydrogen in  $H_2O$

Practice Questions:

1. Calculate the mass percent of oxygen in  $\text{CO}_2$
2. Find the mass percent of chlorine in  $\text{HClO}_3$
3. What is the mass percent of carbon in  $\text{NaHCO}_3$  ?
4. Determine the mass percent of sodium in  $\text{Na}_2\text{SO}_4$ .

## Converting Moles to Grams

- Formula: \_\_\_\_\_

Example:

- Convert 2 moles of  $\text{NaCl}$  to grams:

Practice Questions:

1. How many grams are in 0.75 moles of KI?

2. How many grams are in 4.5 moles of CO?