

Types of Chemical Reactions

Classify, predict and balance

Name _____ Class _____ Date _____

ACTIVITY SERIES AND DATA

K > Na > Ca > Mg > Al > Zn > Fe > Pb > (H) > Cu > Ag > Au · halogens: F > Cl > Br > I

Molar masses (g/mol): Mg 24.31 · MgO 40.31 · Zn 65.38 · Cu 63.55

Balance every equation. Show units in every calculation step.

A. Classifying

1. Classify each reaction: (a) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$ (b) $2\text{HgO} \longrightarrow 2\text{Hg} + \text{O}_2$ (c) $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$ (d) $2\text{Al} + 3\text{CuCl}_2 \longrightarrow 2\text{AlCl}_3 + 3\text{Cu}$ (e) $\text{C}_2\text{H}_4 + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$

B. Predicting products

2. Predict whether a reaction occurs. If it does, write the balanced equation. (a) $\text{Mg} + \text{ZnCl}_2$ (b) $\text{Ag} + \text{CuSO}_4$ (c) $\text{Zn} + \text{HCl}$ (d) $\text{Cl}_2 + \text{NaBr}$ (e) $\text{Br}_2 + \text{NaCl}$

3. Complete and balance: (a) $\text{Na} + \text{Cl}_2 \rightarrow$ (b) $\text{MgCO}_3 \rightarrow$ (on heating) (c) $\text{H}_2\text{SO}_4 + \text{NaOH} \rightarrow$

C. Combustion

4. Write balanced equations for the complete combustion of (a) methane, CH₄ (b) butane, C₄H₁₀. (c) Name a harmful product of incomplete combustion.

D. Double displacement

5. Explain why mixing solutions of silver nitrate and sodium chloride gives a reaction, but mixing potassium nitrate and sodium chloride does not.

E. Calculations

6. 2.43 g of magnesium burns completely in oxygen: $2 \text{Mg} + \text{O}_2 \longrightarrow 2 \text{MgO}$. Calculate the mass of magnesium oxide formed.

7. Excess zinc is added to a copper(II) sulfate solution, and 4.86 g of copper is produced. Calculate the mass of zinc that reacted.

F. Challenge

8. A student places strips of metals X, Y and Z in solutions of each other's salts. X displaces Y and Z; Z displaces Y. Put X, Y and Z in order of reactivity, and explain.