Single Replacement Reactions Quiz Answer Key PDF

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Which halogen is most likely to replace another halogen in a compound?

A. Iodine
B. Bromine
C. Chlorine
D. Fluorine ✓

Which of the following is a single replacement reaction?

A. $2H_2 + O_2 \rightarrow 2H_2O$
B. $NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl$
C. $Zn + 2HCl \rightarrow ZnCl_2 + H_2$ ✓
D. $C + O_2 \rightarrow CO_2$

Explain why a single replacement reaction might not occur even if reactants are present.

A single replacement reaction might not occur if the replacing element is less reactive than the element it is trying to replace.

Which of the following elements is most likely to replace hydrogen in a compound?

A. Gold (Au)
B. Silver (Ag)
C. Zinc (Zn) ✓
D. Copper (Cu)

Which of the following reactions are examples of single replacement reactions? (Select all that apply)

A. $Cu + 2AgNO_3 \rightarrow 2Ag + Cu(NO_3)_2$ ✓

B. 2Na + Cl2 → 2NaCl

C. Fe + CuSO4 → FeSO4 + Cu ✓

D. H2 + Cl2 → 2HCl

In a single replacement reaction involving halogens, which factors determine if the reaction will occur? (Select all that apply)

A. The position of the halogens in the periodic table ✓

B. The color of the halogens

C. The reactivity of the halogens ✓

D. The temperature of the reaction

What are the characteristics of a single replacement reaction? (Select all that apply)

A. Involves exchange of ions between two compounds

B. Involves a free element and a compound ✓

C. Produces a new element and a new compound ✓

D. Requires a catalyst to occur

Provide an example of a single replacement reaction involving a metal and an acid, and explain the process.

An example of a single replacement reaction is when zinc (Zn) reacts with hydrochloric acid (HCl) to produce zinc chloride (ZnCl2) and hydrogen gas (H2). The reaction can be represented as: Zn + 2HCl → ZnCl2 + H2.

Which of the following statements about the activity series are true? (Select all that apply)

A. It ranks metals by their ability to be oxidized. ✓

B. It can predict the outcome of double replacement reactions.

C. It includes both metals and non-metals. ✓

D. It helps determine the feasibility of single replacement reactions. ✓

What is the role of the activity series in single replacement reactions?

A. It predicts the color change in reactions.

B. It determines the solubility of compounds.

C. It ranks elements by reactivity. ✓

D. It measures the temperature change in reactions.

What is the general form of a single replacement reaction?

A. AB + C → AC + B
B. A + BC → AC + B ✓
C. AB + CD → AD + CB
D. A + B → AB

Which of the following metals is least reactive according to the activity series?

A. Lithium (Li)
B. Iron (Fe)
C. Gold (Au) ✓
D. Magnesium (Mg)

In the reaction Cl2 + 2KBr → 2KCl + Br2, which element is being replaced?

A. Chlorine
B. Potassium
C. Bromine ✓
D. None

In a single replacement reaction, which type of element typically replaces another in a compound?

A. A less reactive element
B. A more reactive element ✓
C. An element with a higher atomic number
D. An element with a lower atomic number

Predict the products of the reaction between magnesium and hydrochloric acid, and explain your reasoning.

The products of the reaction are magnesium chloride (MgCl2) and hydrogen gas (H2).

Which of the following metals can displace iron from iron(III) oxide in a single replacement reaction? (Select all that apply)

A. Aluminum (Al) ✓

B. Copper (Cu)

C. Magnesium (Mg) ✓

D. Zinc (Zn) ✓

Which elements can replace hydrogen in acids during single replacement reactions? (Select all that apply)

A. Sodium (Na) ✓

B. Gold (Au)

C. Calcium (Ca) ✓

D. Silver (Ag)

Discuss the industrial applications of single replacement reactions and their significance.

Single replacement reactions are widely used in industries for metal extraction processes, such as the extraction of copper from its ores using scrap iron. They are also important in electroplating, where metals are deposited onto surfaces to improve corrosion resistance and aesthetic appeal. Additionally, these reactions play a role in the production of chemicals, such as the synthesis of hydrogen gas from water using reactive metals.

Describe how the activity series is used to predict the products of a single replacement reaction.

To predict the products of a single replacement reaction, compare the reactivity of the free element with that of the element in the compound using the activity series; if the free element is more reactive, it will replace the less reactive element in the compound.

Explain the difference between single replacement reactions and double replacement reactions.

In a single replacement reaction, an element reacts with a compound and displaces another element from it (e.g., A + BC → AC + B). In a double replacement reaction, two compounds exchange ions or elements to form two new compounds (e.g., AB + CD → AD + CB).