

Ms. Randall

Regents Chemistry

Lab Activity: Double Replacement Reactions

Background:

Antacid tablets contain the compound calcium carbonate, CaCO_3 . This compound reacts with the hydrochloric acid, HCl, in your stomach in the following way:



This reaction is an everyday example of a double replacement reaction. A double replacement reaction usually takes place between two ionic compounds in solution (aqueous). The cation of one compound replaces the cation in the other compound to produce two new ionic compounds. The new combination of cations and anions yields products that may form a precipitate, a gas, or water. Precipitates are insoluble solids that form as a reaction product. In this investigation, you will mix several pairs of aqueous ionic solutions and observe which combinations form precipitates.

Pre-Lab questions:

1. What is a double replacement reaction?

2. What evidence will you be watching for to indicate that a double replacement reaction has occurred?

Objective: To predict and observe double replacement reactions.

Safety:

- *Wear goggles at all times.* Hydrochloric acid can cause burns to the skin and damage the eyes.
- Do not directly inhale any gases produced in this lab.
- Since silver nitrate may stain skin and clothing, avoid contact.

Materials: spot plate, dropper bottles, silver nitrate, iron (III) nitrate, copper(II) nitrate, sodium phosphate, sodium carbonate, sodium hydroxide, sodium chloride.

Procedure:

1. Obtain a spot plate. Add 4 drops of each solution according to the table below:

2. Observe the wells for a few minutes. Record your observations in the provided chart.
If a precipitate occurs record the color. If a precipitate does not form write NR for No reaction in the appropriate box.

	Na_3PO_4	Na_2CO_3	NaOH	NaCl
AgNO_3				
$\text{Fe}(\text{NO}_3)_3$				
$\text{Cu}(\text{NO}_3)_2$				

Clean-up: Rinse all trays well with large quantity of water and place in back sink to soak clean.

Analysis:

Use reference Table F and the information in the table to write the balanced double replacement reaction equation for **all** reactions that formed precipitates in your experiment. Make sure to denote **state of matter** for each reactant and product.

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Lab Conclusion: Double Replacement Reactions

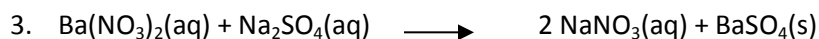
1. Write a paragraph summarizing what you have learned about the scientific concept of the lab from doing the lab. Back up your statement with details from your lab experience.

2. Given the balanced equation:



This reaction is classified a

- A) synthesis
B) decomposition
C) single replacement
D) double replacement



What type of reaction is shown above?

- A) synthesis
B) decomposition
C) single replacement
D) double replacement

4. Which equation represents a double replacement reaction?

- A) $2 \text{Na} + 2 \text{H}_2\text{O} \longrightarrow 2 \text{NaOH} + \text{H}_2$
B) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
C) $\text{LiOH} + \text{HCl} \longrightarrow \text{LiCl} + \text{H}_2\text{O}$
D) $\text{CH}_4 + 2 \text{O}_2 \longrightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$

5. Which two solutions, when mixed together, will undergo a double replacement reaction and form a white, solid substance?

- A) $\text{NaCl}(\text{aq})$ and $\text{LiNO}_3(\text{aq})$
B) $\text{KCl}(\text{aq})$ and $\text{AgNO}_3(\text{aq})$
C) $\text{KCl}(\text{aq})$ and $\text{LiCl}(\text{aq})$
D) $\text{NaNO}_3(\text{aq})$ and $\text{AgNO}_3(\text{aq})$