

Pre-Lab Information

Purpose	Explore different types of chemical reactions in a laboratory procedure.
Time	Approximately 45 minutes
Question	How does knowing the reactants and products help you classify a chemical reaction?
Summary	You will carry out four different reactions. For each, you will be given at least one of the following pieces: reactant(s), product(s), or type of reaction. You will then complete an experiment to determine the remaining pieces.

Safety

- Always wear safety glasses, lab apron, and gloves while performing an experiment.
- Use the Bunsen burner with caution; the flame can accidentally ignite nearby objects.
- Keep your work area clear of all materials except those needed for the experiment.
- Do not smell or taste any of the chemicals.
- Use chemical-resistant gloves when handling chemicals and tongs to move hot objects.
- Report all accidents – no matter how big or small – to your teacher.
- Dispose of all materials properly at the end.

Materials

- | | | |
|--------------------|-----------------------|--|
| ▪ 2 Bunsen burners | ▪ 2 transfer pipettes | ▪ small spoonful Na_2CO_3 |
| ▪ 2 strikers | ▪ evaporating dish | ▪ 20 drops 1 M CuSO_4 solution |
| ▪ 2 tweezers | ▪ 4 test tubes | ▪ 10 drops 0.1 M KI solution |
| ▪ sandpaper | ▪ 3 test tube holders | ▪ 10 drops 0.1 M $\text{Pb}(\text{NO}_3)_2$ solution |
| ▪ spatula | ▪ 3 in. copper wire | ▪ 2 Bunsen burners |

Student Guide

Procedure

Reaction 1: Add Zinc to Copper Sulfate

- Prepare** Place about twenty drops of copper (II) sulfate solution in a test tube.
- Observe** Record the appearance (colors, texture) of the reactants in the data table.
- Predict** Label each reactant type. Then, choose the type of reaction you expect for the reactants.
- React** Use tongs to place a piece of zinc metal into the copper sulfate solution. Allow the two substances to react for a few minutes.
- Observe** Record observations of the reaction and products in the data table.
- Analyze** Complete the balanced chemical equation in the data table. Then, determine the type of reaction.

Reaction 2: Mix Potassium Iodide and Lead (II) Nitrate

- Prepare** Place about ten drops of potassium iodide solution in a test tube.
Place about ten drops of lead (II) nitrate solution in a test tube.
- Observe** Record the appearance (colors, texture) of the reactants in the data table.
(Note the appearance of each solution separately.)
- Predict** Choose the type of reaction you expect for the reactants PI and
- React** Add the lead nitrate solution to the potassium iodide solution, and allow the two solutions to mix.
- Observe** Record observations of the reaction and products in the data table.
- Analyze** Complete the balanced chemical equation in the data table. Then, determine the type of reaction.

Reaction 3: Burn Copper Wire

- Prepare** Use sandpaper to clean a 3-inch piece of copper wire until it is shiny.
- Observe** Record the appearance (colors, texture) of the reactant in the data table.
(How does the wire appear?)
- Predict** Label each reactant type. Then, choose the type of reaction you expect for the reactants.
- React** Turn on the Bunsen burner. Use metal tongs to hold the copper wire in the hottest part of the flame for about two minutes.

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Observe Record observations of the reaction and products in the data table.
(Turn off the Bunsen burner.)

Analyze Complete the balanced chemical equation in the data table. Then, determine the type of reaction.

Reaction 4: Heat Sodium Carbonate

Prepare Use a small spatula to place about half of an inch of sodium carbonate in a clean, dry test tube.

Observe Record the appearance (colors, texture) of the reactant in the data table.

Predict Label each reactant type. Then, choose the type of reaction you expect for the reactants.

React Use a test tube holder to heat the test tube over the flame for about three minutes until changes occur.

Observe Record observations of the reaction and products in the data table.
(Turn off the Bunsen burner.)

Analyze Complete the balanced chemical equation in the data table. Then, determine the type of reaction.

When finished, dispose of all substances as directed by your teacher.

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Data

Record your data either in your lab notebook or in the space below.

Reaction 1: Add Zinc to Copper Sulfate

Observations of Reactants	
Predicted Type(s) of Reaction	
Observations of Products	
Balanced Chemical Equation	$\rightarrow \text{___ Cu(s)} + \text{___ } \text{_____} \text{(aq)}$
Type(s) of Reaction	

Reaction 2: Mix Potassium Iodide and Lead (II) Nitrate

Observations of Reactants	
Predicted Type(s) of Reaction	
Observations of Products	
Balanced Chemical Equation	$\rightarrow \text{___ PbI}_2\text{(s)} + \text{___ } \text{_____} \text{(aq)}$
Type(s) of Reaction	

Reaction 3: Burn Copper Wire

Observations of Reactants	
Predicted Type(s) of Reaction	
Observations of Products	
Balanced Chemical Equation	$\text{___ } \text{_____} \text{(s)} + \text{___ } \text{_____} \text{(g)} \rightarrow \text{___ CuO(s)}$
Type(s) of Reaction	

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Reaction 4: Heat Sodium Carbonate

Observations of Reactants	
Predicted Type(s) of Reaction	
Observations of Products	
Balanced Chemical Equation	_____ (s) \rightarrow _____ Na ₂ O(s) + _____ CO ₂ (g)
Type(s) of Reaction	