# 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 accidently 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 Na2CO3 |
| * 2 strikers | * evaporating dish | * 20 drops 1 M CuSO4 solution |
| * 2 tweezers | * 4 test tubes | * 10 drops 0.1 M Kl solution |
| * sandpaper | * 3 test tube holders | * 10 drops 0.1 M Pb(NO3)2 solution |
| * spatula | * 3 in. copper wire | * 2 Bunsen burners |

# 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.

**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.**

# 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** | **→ \_\_\_\_Cu(s) + \_\_\_\_ \_\_\_\_\_\_\_\_\_(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** | **→ \_\_\_\_PbI2(s) + \_\_\_\_ \_\_\_\_\_\_\_\_\_(aq)** |
| **Type(s) of Reaction** |  |

**Reaction 3: Burn Copper Wire**

|  |  |
| --- | --- |
| **Observations of Reactants** |  |
| **Predicted Type(s) of Reaction** |  |
| **Observations of Products** |  |
| **Balanced Chemical Equation** | **\_\_\_\_ \_\_\_\_\_\_\_(s) + \_\_\_\_ \_\_\_\_\_\_\_(g)** ⟶ **\_\_\_\_CuO(s)** |
| **Type(s) of Reaction** |  |

**Reaction 4: Heat Sodium Carbonate**

|  |  |
| --- | --- |
| **Observations of Reactants** |  |
| **Predicted Type(s) of Reaction** |  |
| **Observations of Products** |  |
| **Balanced Chemical Equation** | **\_\_\_\_\_ \_\_\_\_\_\_\_\_(s)** ⟶ **\_\_\_\_\_Na2O(s) + \_\_\_\_\_ CO2(g)** |
| **Type(s) of Reaction** |  |