

## Recording Scientific Observations Lab Report Sheet

Date:

Name:

Lab Partner(s):

Purpose:

For our first lab, a sample Purpose has been provided below to offer an example of how to write a thorough Purpose section. I have also noted in red some hints on how to answer each question. Check with your instructor to see if there is anything that needs to be done to further complete this section for this week's lab.

Prepare for the lab by answering the following questions. Use complete sentences, avoiding the use of "I" or "we".

1. What is the main topic/concept being investigated today? This is typically a summary of the Objectives for the experiment.
2. How will you investigate this topic/concept? This is a brief summary of the experiment. This should not be the full procedure.
3. Write the main definitions and equations needed for today's experiment. These are typically the bolded terms or equations provided in the introduction or explanations of the specific types of data you need to record in this experiment. Notice these aren't just provided as a list at the end, but are embedded throughout the Purpose paragraph.

The purpose of this experiment is to learn to recognize the signs that a chemical reaction has occurred, and learn to collect detailed scientific observations using proper scientific terms. These observations may be either qualitative (descriptive) or quantitative (numerical). These objectives will be accomplished by mixing together two substances (reactants) and looking for signs of a chemical reaction. Detailed observations will be recorded on the appearance of the reactants before and after mixing them together. After the reactants are mixed together, any of the following observations will indicate that a chemical reaction has taken place: formation of a precipitate (solid), gas evolution (bubbling), color changes, or heat evolution or absorption (getting hotter or colder). The recorded observations will be used to determine when a reaction has taken place based on these criteria.

### Procedural Notes and Data

Note: For each of the reactions below, **record detailed observations using proper scientific terminology** that provide evidence for a chemical reaction (initial color of the solutions, final color of solution, color of precipitate formed (if any), sounds, heat evolved/absorbed, gases evolved, etc.). **Note: for "reaction type", the options are: precipitation, gas evolution, heat evolution, and heat absorption.**

#### Reaction Set #1

Table 1: Observations for Reaction (1a)

Reagent	Initial Observations	During Reaction	After Reaction	Reaction type?
$\text{Pb}(\text{NO}_3)_2$				
$\text{K}_2\text{CrO}_4$				



Table 2: Observations for Reaction (1b)

Reagent	Initial Observations	During Reaction	After Reaction	Reaction type?
$\text{Pb}(\text{NO}_3)_2$				
$\text{Na}_2\text{SO}_4$				

## Reaction Set #2

Table 3: Observations for Reaction (2a)

Reagent	Initial Observations	During Reaction	After Reaction	Gas Identity
HCl				
Mg			Splint Test Observations	Reaction type?

Table 4: Observations for Reaction (2b)

Reagent	Initial Observations	During Reaction	After Reaction	Gas Identity
$\text{H}_2\text{O}_2$				
$\text{KMnO}_4$			Splint Test Observations	Reaction type?

Table 5: Observations for Reaction (2c)

Reagent	Initial Observations	During Reaction	After Reaction	Gas Identity
$\text{HC}_2\text{H}_3\text{O}_2$				
$\text{NaHCO}_3$			Splint Test Observations	Reaction type?

### Reaction Set #3

Table 6: Observations for Reaction (3a)

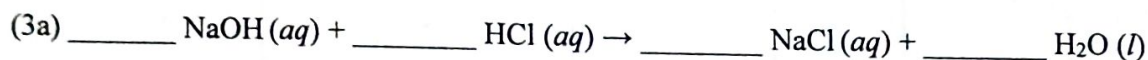
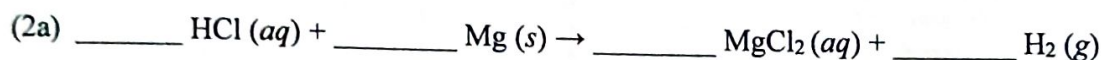
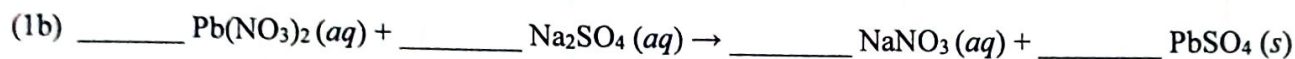
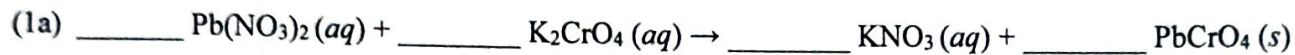
Reagent	Initial Observations	During Reaction	After Reaction	Reaction type?
NaOH				
HCl				

Table 7: Observations for Reaction (3b)

Reagent	Initial Observations	During Reaction	After Reaction	Reaction type?
Water				
NH <sub>4</sub> Cl				

## Calculations

1. Provide balanced chemical equations for each of the chemical reactions that you performed. [Reaction (2b) is omitted here.] For help with balancing reactions, you can reference the textbook, this video example, or this video example.





### Analysis & Discussion

1. Which of the reactions (1a, 1b, 2a, 2b, 2c, 3a, and/or 3b) did you classify as precipitation reactions? Use your data to support your conclusions in 1 – 2 sentences.
2. Which of the reactions (1a, 1b, 2a, 2b, 2c, 3a, and/or 3b) did you classify as gas evolution reactions? Use your data to support your conclusions in 1 – 2 sentences.
3. For the gas evolution reactions, state the identity of the gas produced for each reaction. Use your data to support your conclusions in 1 – 2 sentences.
4. Which of the reactions (1a, 1b, 2a, 2b, 2c, 3a, and/or 3b) did you classify as heat evolution or absorption reactions? Use your data to support your conclusions in 1 – 2 sentences.
5. What qualitative data did you collect in this experiment?
6. What quantitative data did you collect in this experiment?

7. Based on this experiment, make a brief but convincing argument for why detailed scientific observations are important when conducting experiments in the laboratory.

## Conclusion

For our first lab, a sample Conclusion has been provided below to offer an example of how to write a thorough Conclusion section. I have also noted in red some hints on how to answer each question. Check with your instructor to see if there is anything that needs to be done to further complete this section for this week's lab.

Summarize the lab by answering the following questions in your lab notebook. Use complete sentences, avoiding the use of "I" or "we".

1. What is the main topic/concept being investigated today? This is typically a summary of the Objectives for the experiment. Notice that this is now in PAST tense.
2. How will you investigate this topic/concept? This is a brief summary of the experiment. Notice that this is now in PAST tense.
3. What were the main results found in this experiment? This is a summary of your actual results. You don't need to restate each piece of data you collected, but you should summarize the big results you found. As you write the conclusion, you should reference the data section, calculation section and/or analysis and discussion section when applicable.
4. Summarize any errors encountered in this experiment and how they may have affected the results. "Human error" is **NOT** an acceptable answer. Be specific about the type of error that may have impacted the results. "Human error" is not specific enough. You should have a specific error(s) that were or could be encountered. You should explain how this error affects your results. If percent error is calculated, you should state this and explain what it means in terms of your results.

The purpose of this experiment was to learn to recognize the signs that a chemical reaction has occurred and learn to collect detailed scientific observations using proper scientific terms. These objectives were accomplished by mixing together two substances (reactants) and looking for signs of a chemical reaction. Detailed observations were recorded on the appearance of the reactants before and after mixing them together and used to determine when a reaction had taken place. Based on the data, all the mixtures resulted in chemical reactions. Reaction set 1 were precipitation reactions (as evidence by the formation of a solid in the solutions), reaction set 2 were gas evolution reactions (as evidence by the formation of bubbles in the solutions), and reaction set 3 were heat evolution/absorption reactions (as evidence by the solutions becoming either hotter or colder during the reaction).