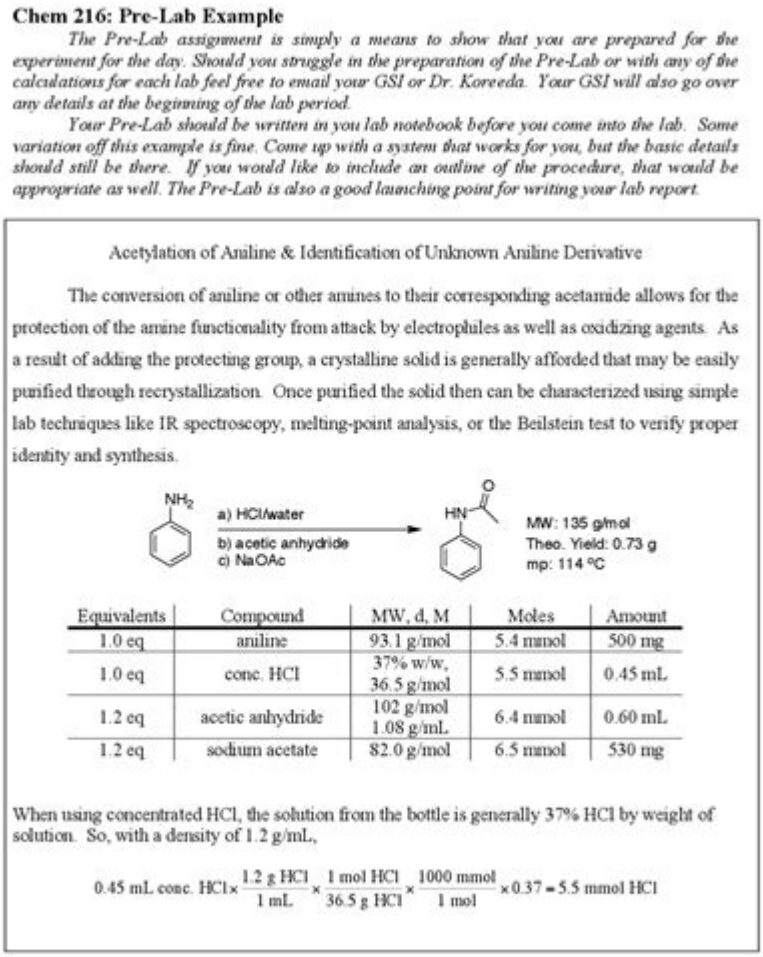
Chemistry Pre Lab Example



Chem 216: Pre-Lab Example

The Pre-Lab assignment is simply a means to show that you are prepared for the experiment for the day. Should you struggle in the preparation of the Pre-Lab or with any of the calculations for each lab feel free to email your GSI or Dr. Koreeda. Your GSI will also go over any details at the beginning of the lab period.

Your Pre-Lab should be written in you lab notebook before you come into the lab. Some variation off this example is fine. Come up with a system that works for you, but the basic details should still be there. If you would like to include an outline of the procedure, that would be appropriate as well. The Pre-Lab is also a good launching point for writing your lab report.

Acetylation of Aniline & Identification of Unknown Aniline Derivative

The conversion of aniline or other amines to their corresponding acetamide allows for the protection of the amine functionality from attack by electrophiles as well as oxidizing agents. As a result of adding the protecting group, a crystalline solid is generally afforded that may be easily purified through recrystallization. Once purified the solid then can be characterized using simple lab techniques like IR spectroscopy, melting-point analysis, or the Beilstein test to verify proper identity and synthesis.

Equivalents	Compound	MW, d, M	Moles	Amount
1.0 eq	aniline	93.1 g/mol	5.4 mmol	500 mg
1.0 eq	conc. HCl	37% w/w, 36.5 g/mol	5.5 mmol	0.45 mL
1.2 eq	acetic anhydride	102 g/mol 1.08 g/mL	6.4 mmol	0.60 mL
1.2 eq	sodium acetate	82.0 g/mol	6.5 mmol	530 mg

When using concentrated HCl, the solution from the bottle is generally 37% HCl by weight of solution. So, with a density of 1.2 g/mL,

$$0.45\ \text{mL conc. HCl} \times \frac{1.2\ \text{g HCl}}{1\ \text{mL}} \times \frac{1\ \text{mol HCl}}{36.5\ \text{g HCl}} \times \frac{1000\ \text{mmol}}{1\ \text{mol}} \times 0.37 = 5.5\ \text{mmol HCl}$$

Chemistry pre lab example is an essential part of any laboratory experiment in the field of chemistry. A pre-lab is a preparatory document that outlines the objectives, methods, and safety protocols for an experiment before it is conducted. It serves as a guide that ensures students and researchers understand the purpose of the experiment, the materials required, and the procedures that need to be followed. This article will delve into the importance of pre-lab preparations, the components of a pre-lab report, and provide a detailed example to illustrate how a pre-lab is structured.

The Importance of Pre-Lab Preparation

Preparing a pre-lab is crucial for several reasons:

1. Enhances Understanding: A well-prepared pre-lab helps students and researchers grasp the

concepts they will be testing, making it easier to understand the results after the experiment.

2. Promotes Safety: Safety is paramount in chemistry labs. A pre-lab includes safety protocols, which help in identifying potential hazards and the proper methods to mitigate them.

3. Improves Efficiency: By outlining procedures and materials beforehand, a pre-lab helps in organizing the workflow, minimizing time spent locating materials or clarifying procedures during the experiment.

4. Facilitates Data Collection: A clear outline of the experimental methods aids in systematic data collection, ensuring that important observations are not overlooked.

5. Encourages Critical Thinking: Writing a pre-lab involves analyzing the experiment and predicting outcomes, which fosters critical thinking skills.

Components of a Pre-Lab Report

A comprehensive pre-lab report typically includes the following sections:

1. Title

The title should be clear and concise, indicating the focus of the experiment. For example, "Determining the Molar Mass of a Volatile Liquid".

2. Objective

This section states the purpose of the experiment. For instance, "The objective of this experiment is to determine the molar mass of a volatile liquid using the ideal gas law."

3. Background Information

This part provides necessary theoretical context for the experiment. It may include relevant chemical principles, definitions, and previous studies related to the experiment.

4. Materials Required

A list of all materials, reagents, and equipment needed for the experiment. This should include quantities and specifications. For example:
- Volatile liquid (e.g., ethyl acetate)
- Round-bottom flask
- Heating mantle
- Thermometer
- Balance
- Water

5. Safety Precautions

This section outlines the safety measures to be taken during the experiment. It might include:
- Wear safety goggles and gloves.
- Work in a well-ventilated area or fume hood.
- Handle volatile liquids with care to avoid inhalation and skin contact.

6. Procedure

A step-by-step guide on how to conduct the experiment. Each step should be numbered for clarity. For example:
1. Measure a specific mass of the volatile liquid using the balance.
2. Assemble the apparatus with the round-bottom flask connected to a condenser.
3. Heat the flask gently using the heating mantle until the liquid vaporizes.
4. Measure the temperature and pressure of the vapor.
5. Collect data for molar mass calculation.

7. Data Collection and Analysis

Outline how data will be collected and analyzed. For instance:
- Record the mass of the liquid.
- Measure the temperature of the vapor.
- Document the atmospheric pressure.
- Use the ideal gas law (PV=nRT) to calculate the molar mass.

8. Conclusion

This section should briefly discuss what the expected outcomes of the experiment are based on the objective and background information.

Example Pre-Lab Report: Determining the Molar Mass of a Volatile Liquid

Title: Determining the Molar Mass of a Volatile Liquid

Objective: The objective of this experiment is to determine the molar mass of a volatile liquid using the ideal gas law.

Background Information:
The molar mass of a substance is the mass of one mole of that substance. For gases, the ideal gas law (PV=nRT) can be used, where P is the pressure, V is the volume, n is the number of moles, R is the gas constant, and T is the temperature in Kelvin. The relationship allows us to determine the molar mass by rearranging the equation to find n (number of moles) and subsequently calculating the molar mass (M) using the formula M = mass/n.

Materials Required:

- Volatile liquid (ethyl acetate) – 50 mL
- Round-bottom flask – 250 mL
- Heating mantle
- Thermometer
- Balance – 0.001 g precision
- Water
- Stopper
- Condenser

Safety Precautions:
- Wear safety goggles and gloves at all times in the lab.
- Ensure the lab is well-ventilated or conduct the experiment in a fume hood.
- Avoid skin contact with the volatile liquid; in case of contact, wash immediately with soap and water.
- Dispose of all chemicals according to local environmental regulations.

Procedure:
1. Weigh the empty round-bottom flask and record the mass.
2. Add approximately 50 mL of ethyl acetate to the flask, then weigh it again and record the mass.
3. Set up the apparatus: connect the round-bottom flask to the condenser and ensure the heating mantle is ready.
4. Heat the flask slowly using the heating mantle until the liquid begins to vaporize.
5. Insert the thermometer into the flask to monitor the temperature.
6. Once the vapor is produced, record the temperature and atmospheric pressure.
7. Allow the vapor to escape until a constant temperature and pressure are achieved, then collect the necessary data to calculate the molar mass.

Data Collection and Analysis:
- Record the mass of the volatile liquid before and after vaporization.
- Measure the temperature of the vapor (in Celsius) and convert it to Kelvin (K = °C + 273.15).
- Record the atmospheric pressure in mmHg.
- Calculate the number of moles using the ideal gas law and determine the molar mass of the volatile liquid based on the mass used.

Conclusion:
The experiment aims to accurately determine the molar mass of ethyl acetate through the application of the ideal gas law. By understanding the relationship between pressure, volume, temperature, and number of moles, we can derive the molar mass and gain insights into the properties of volatile liquids.

In conclusion, a chemistry pre lab example serves as a fundamental tool for students and researchers to prepare for their experiments effectively. By understanding the components and structure of a pre-lab report, individuals can enhance their learning experience, improve safety in the lab, and facilitate a better understanding of experimental outcomes. This practice not only aids in academic success but also builds essential skills for future scientific endeavors.

Frequently Asked Questions

What is a chemistry pre-lab report?

A chemistry pre-lab report is a document prepared by students before conducting an experiment. It outlines the purpose, hypothesis, materials, procedures, and safety considerations for the experiment.

Why is a pre-lab important in chemistry?

A pre-lab is important because it helps students understand the experiment's objectives, prepare for potential challenges, and ensure they follow safety protocols, leading to more effective and safe lab work.

What key components should be included in a pre-lab report?

Key components of a pre-lab report typically include the title, objective, background information, materials list, detailed procedure, safety information, and data table for observations.

How do you formulate a hypothesis for a chemistry pre-lab?

To formulate a hypothesis for a chemistry pre-lab, review the background information, identify the variables involved, and predict the outcome based on scientific principles or prior knowledge.

What safety considerations should be noted in a pre-lab?

Safety considerations in a pre-lab should include potential hazards of chemicals used, personal protective equipment required, emergency procedures, and proper disposal methods for chemical waste.

How can students prepare for unexpected results in a pre-lab?

Students can prepare for unexpected results by reviewing the expected outcomes, understanding possible sources of error, and planning for troubleshooting steps in their pre-lab report.

What role does background research play in a pre-lab?

Background research in a pre-lab provides context for the experiment, helps students understand the underlying principles, and informs the formulation of the hypothesis and procedures.

How can a pre-lab help with time management during the experiment?

A well-prepared pre-lab helps with time management by outlining the steps and timing needed for each part of the experiment, allowing students to work efficiently and stay on track.

What are common mistakes to avoid in a chemistry pre-lab?

Common mistakes to avoid in a chemistry pre-lab include vague objectives, incomplete procedures, neglecting safety protocols, and failing to cite relevant background research.

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