

Biochemistry Worksheet

Part 2. pH and Protein Solubility Demonstration

Pre-Demonstration Questions

1. Describe or draw the molecules and ions in an acidic solution (pH less than 7).
2. Describe or draw the molecules and ions in a basic solution (pH greater than 7).
3. Water is a polar molecule. Explain how this is related to the solubility of substances in water.

Data Table

Chemical Added to Casein	Observations	Approximate pH
25 mL Sodium hydroxide		
1–2 mL Hydrochloric acid		
2–3 mL Hydrochloric acid		
2–3 mL Sodium hydroxide		
1–2 mL Sodium hydroxide		

Modeling

In your group, construct three models that show the solubility of casein at different pH levels. The first model is a sample with a pH of 2. The second model is a sample with a pH of 4. The third model is a sample with a pH of 12.

Casein in pH 2 Solution	Casein in pH 4 Solution	Casein in pH 12 Solution

Part 3A. Introductory Activity—Testing Unknowns

Data Table

Unknown	Carbohydrate	Protein	Lipid
A			
B			
C			
D			

Identify the major biochemical(s) in each unknown.

Part 3B. Guided-Inquiry Design and Procedure *(Use a separate sheet of paper to complete the following steps in the design process.)*

In your group, design an investigation that uses one or more the tests above to answer a question concerning food and biochemical molecules.

1. Record the research question.
2. Define the limitations of the tests including the types of compounds not detected by the test.
3. Identify the control, independent variable, dependent variable and critical constants.
4. Record the working procedure. If changes must be made to the working procedure, record those changes here.
5. Explain the safety procedures needed to carry out the investigation safely.
6. Carry out the investigation and record relevant data.
7. Display relevant data in a meaningful way to help communicate the results of the investigation.

Post-Lab Analysis *(Use a separate sheet of paper to answer the following questions.)*

1. Using a claims, evidence, and reasoning model, explain the results the experiment.
 - a. Propose a claim based in scientific understanding.
 - b. Discuss specific evidence from the experiment.
 - c. Discuss the reasoning for the claim based on connections to the POGIL activity, the demonstration, and the introductory lab activity.