

Food Explorations Lab: Exploring Acids & Bases

STUDENT LAB INVESTIGATIONS

Name: _____

Lab Overview

In this investigation, you will use cabbage juice indicator to determine if two unknown samples are acids or bases. Based on your results, you will determine if other household substances are acidic, basic, or neutral and the identity of the unknown samples.

Lab Objectives

In this lab, you will learn how to...

1. Use cabbage juice (pH indicator) to determine if substances are acidic, basic, or neutral.
2. Determine the identity of unknown substances.
3. Identify acids as substances that lose a hydrogen ion and bases as substances that gain a hydrogen ion.

Lab Safety: Before beginning ANY investigation you should put on your safety goggles and apron. It is important to avoid getting chemicals on your hands. Always wash your hands following completion of an investigation. When handling food, you should also wash your hands prior to beginning an investigation.

PART A: Identification of Unknown Substances

MATERIALS

Powder sample A
Powder sample B
200 mL red cabbage juice (pH indicator)
250 mL jar or beaker
2 plastic spoons
1- 100 mL graduated cylinder or metric measuring cup
pH Color Chart
safety goggles
aprons (optional)

PROCEDURE

1. Obtain unknown sample A and B from the teacher.
2. Obtain 200 mL red cabbage juice (pH indicator) from the teacher in a jar or beaker.
3. Describe your visual observations of each unknown sample in Table A.
4. What do you think will happen upon mixing the pH indicator with each sample?

Prediction for Sample A: _____

Prediction for Sample B: _____

1. Measure and pour 100 mL of the pH indicator into Sample A and stir with a plastic spoon.
2. Measure and pour 100 mL of the pH indicator into Sample B and stir with a different plastic spoon.
3. Record your observations in Table A. Use the pH color chart to identify if each sample is an acid or a base.
4. Set aside the cups of Sample A and B to allow for comparison of samples in Part B of this lab investigation.

- Using the *pH Color Chart* provided and your observations, determine if Samples A and B are acids or bases. (Circle your answer in Table A.)
- Based on the reading *Cooking with Chemistry*, describe the reactions observed in Sample A and Sample B in terms of hydrogen ions present in the solutions.

PART B: Identifying the Unknown Substances

Lab Question

Which of the following household substances are acids, which are bases, and which are neutral?

Cream of Tartar _____

Baking Soda _____

Salt _____

Vinegar _____

Table B: Predictions: (Fill in the following chart to record your predictions)

Substance	Predicted color change when mixed with pH indicator	Predicted pH - Acid, Base, or Neutral?
Cream of Tartar		
Baking Soda		
Salt		
Vinegar		

Two of the household substances from above are identical to unknown substances A and B. Based on your observations, predict what Sample A and Sample B are.

Sample A (prediction) = _____

Sample B (prediction) = _____

MATERIALS

Unknown Sample A (from Part A)
 Unknown Sample B (from Part A)
 4 Pre-labeled clear containers with pre-mixed solutions
 pH Color Chart

PROCEDURE

- Obtain the 4 containers from the teacher. Each container should have one of the following substances mixed with red cabbage juice (pH indicator).
 - 100 mL pH Indicator and 1 tsp. Cream of Tartar
 - 100 mL pH Indicator and 1 tsp. Baking Soda
 - 100 mL pH Indicator and 1 tsp. Salt
 - 100 mL pH Indicator and 100 ml Vinegar
- Using the pH color chart, order each substance by color (red to yellow) and determine if it is an acid or a base.

Table C: Testing pH of Substances

	Substance	Color	pH	Acid, Base, or Neutral
1				
2				
3				
4				

Conclusion

1. Using your data, explain if your original responses were correct.

2. Compare and contrast the chemical reactions that occurred in this activity.

3. Based on your observations, what is each sample?

Sample A: _____

Sample B: _____

4. Complete Table D:

Table D: Other substances

Substance	Hydrogen ion (Gain, Lose or None)	Acid, Base or Neutral	Color
Rain water			
Lemon juice			
Soap			
Ammonia cleaner			