Chemistry CP

Name:

Activity: Household Acids and bases

Section:

There are a number of ways to determine the pH of a solution. One way is to use a pH meter, of which there are many makes and models. Another way is with the use of *pH indicators*—organic dyes or pigments that are weak acid-base systems that change color in the presence of different pH values. Many plant pigments exhibit a variety of colors when placed in solutions of different pH values. In this lab you will use a set of buffers of known pH and a pigment extracted from red cabbage to determine the pH of various household products.

Objectives

- Use a set of buffers of known pH and plant pigment to determine the pH of various products.
- Classify household substances as acidic or basic.

Materials

Various household products	Micropipettes	Microwell plate
	Red cabbage extract	

Safety

Wear safety glasses and a lab apron. Avoid skin contact with the solutions to be tested. Never taste any materials that you find in lab.

Roles

Project Manager—Reads instructions, keeps group on task
Quality Control Manager—Records data
Materials Manager—Gets and returns materials, makes sure lab bench is cleaned up

Procedure

1. Using a micropipette, transfer 3 drops of each buffer solution to a well in the microwell plate.
2. Add one drop of red cabbage extract to each buffer solution.
3. Record the color of each solution in Table 1A. Complete table 1A.
4. Add 3 drops of each of the various household products to a well in the microwell plate.
5. Add one drop of red cabbage extract to each product.
6. Use your results from Table 1A to determine the pH of each substance. Record the results in Table 1B. Complete Table 1B by identifying the major ingredients of each product that determines its pH.

Analyze and Apply Questions

1. Are the cleaning products acids, bases, or neutral?
2. What are acid/base characteristics of foods and beverages?
3. Look at the original containers for the household products. Do you find consumer warning labels on basic or acidic products?
4. Can cabbage juice indicator be used to determine the strength of acids and bases? Explain.
5. List advantages and disadvantages of litmus and cabbage juice indicators.
6. The pH of a solution was found to be 5.78. What is the pOH, $[H_3O^+]$ and $[OH^-]$? Show all your work.

Table 1A pH Range and Color Changes of Cabbage Extract

pH of Buffer Solution	Description of Color	$[H_3O^+]$	Condition of Solution (Acidic, basic, neutral)
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

Table 1B pH of Common Solutions

Solution	pH	$[H_3O^+]$ (approximate)	Condition of Solution (Acidic, basic, neutral)	Compound Used to Prepare Solution

Chemistry CP

Date:

Group Processing Report

Group Members:

_____ _____

_____ _____

	Yes	Sometimes	No
We accomplished our assignment.			
We stayed with our group.			
We gave praise to all members of the group when needed.			
We helped all group members when needed.			
We shared our materials.			
We feel all group members contributed to this assignment.			

We learned:

We re-learned:

Areas in which we could show improvement:

Comments and suggestions:

Group Signatures:

_____ _____

_____ _____