Name: _____ Date: _____ Period: _____

Acids and Bases Cabbage Lab

HONORS CHEMSITRY Pre-Lab

1. Determine the molarity of a strong Monoprotic acid needed to make a solution with the following pH
    a. pH = 1

    b. pH = 3

    c. pH = 5

2. Acid Dilution calculations
    a. Assuming the acid used in this experiment has an initial molarity of 1.00 M determine the volume necessary to make 20 mL needed for a pH of 1

    b. Using the solution created in 2a determine the determine the volume necessary to make 20 mL needed for a pH of 3

    c. Using the solution created in 2b determine the determine the volume necessary to make 20 mL needed for a pH of 5

3. Determine the molarity of a strong base needed to make a solution with the following pH
    a. pH = 13

    b. pH =11

    c. pH = 9

4. Base dilution calculations
    a. Determine the mass of NaOH needed to make 20 mL of a 1.00 M solution.

    b. Using the base created in 4a with a concentration of 1.00 M determine the volume needed to make 20 mL with the concentration needed for a pH of 13

    c. Using the base created in 4b determine the volume needed to make 20 mL with the concentration needed for a pH of 11

    d. Using the base created in 4c determine the volume needed to make 20 mL with the concentration needed for a pH of 9

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Acids and Bases Cabbage Lab

Safety	Materials:	Items to test	Items to test
• Closed toe shoes • Hot hands • Goggles	• Test Tubes • Test Tube rack • Red Cabbage Juice • Pipettes	• White vinegar • Baking soda • Shampoo • Hand sanitizer • hand soap	• Pure Water • Salt water • Lemon soda • Sparkling water

Pre Lab

1. Predict if the items to be tested are acidic, basic or neutral
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____

Creating indicator procedure

2. Tear or cut cabbage leaves into fairly small pieces and place them in a large bowl or glass pitcher.
3. Pour boiling water over the leaves to cover them completely, then let this "tea" steep for several minutes until the liquid turns a purplish color.
4. Once it has cooled, remove most of the leaves or filter them using a strainer, colander or funnel with coffee filter. It's the juice that we want. You could also simply spoon out the juice without removing the leaves if you like.

Creating pH scale to compare to

5. Fill each test tube 1/3 full with solution of KNOWN pH
6. Add 3-5 drops of cabbage juice to each test tube and note the color of each

pH of 1 solution color: _____

pH of 3 solution color: _____

pH of 5 solution color: _____

pH of 7 solution color: _____

pH of 9 solution color: _____

pH of 11 solution color: _____

pH of 13 solution color: _____

Testing house hold substances

7. In fill individual test tubes 1/3 full with substance to be tested. If substance is a solid it MUST be dissolved in water prior to adding the cabbage juice.

8. Add 3-5 drops of cabbage juice to each test tube and note the change in color.
9. Compare each of the test substances to the color of substances with known pH's and estimate the pH of the substances

Household substance	Color w/ cabbage juice	Estimated pH

Post Lab questions

10. For each of the items tested state if it is acidic basic or neutral and if your prediction was correct

Substance	Acid, Base or Neutral	Prediction correct (yes or no)

11. Is red cabbage indicator more useful than an indicator such as litmus, which is only one color in acid and one color in base? Explain why or why not.

12. Is a solution which turns red cabbage indicator green acidic or is it basic? Is a solution which turns red cabbage indicator violet acidic or is it basic?

13. A substance is known to have a pH of 7.5 what is its pOH, $[H^{+1}]$, and $[OH^{-1}]$

14. A substance is known to have a pOH of 9.5 what is its pH, $[H^{+1}]$, and $[OH^{-1}]$