

Mr. Hanson's Science Class

Acid/Base Chemistry Experiments for 2014



In this lab, you will experiment and test Acids and Bases and determine the pH of the acid or the base. The pH tells us how strong/weak an acid or base is, and also whether it is harmful to living things.

1. Lesson about the pH scale and determining what are acids/bases?
 - a. http://www.ducksters.com/science/acids_and_bases.php

Materials:

6 Test tubes

1 beaker for water rinsing

Tap water, soda water, vinegar, lemon juice, Pepsi, baking soda, ammonia, shampoo, bleach, Isopropyl alcohol, alka seltzer, distilled water.

1 test tube rack

1 Vernier Labquest

1 Vernier pH meter

1 paper towel

Tape to label test tubes

pH Paper and cup

1 Forceps

Goggles

pH indicator Bromothymol Blue or Red Cabbage Juice

Website: http://www.funsci.com/fun3_en/acids/acids.htm

SAFETY CONSIDERATIONS:

- 1. DO NOT MIX THE DROPPERS. KEEP THE DROPPER WITH THE TYPE OF ACID OR BASE OR pH INDICATOR. ALSO KEEP THE TEST TUBES IN THE BROWN BIN AT ALL TIMES UNLESS YOU NEED TO LOAD ONE TEST TUBE WITH A SOLUTION. YOU CANNOT CARRY THE TEST TUBES IN THE TEST TUBE RACK BECAUSE THEY WILL FALL OUT.**
- 2. GOGGLES WILL BE WORN THROUGHOUT THIS EXPERIMENT.**
- 3. THE pH SENSORS ARE EXTREMELY BREAKABLE – THE END IS MADE OF THIN GLASS, SO BE VERY CAREFUL WITH THEM. WHEN NOT IN USE COVER THEM IN THE PAPER TOWEL AND PLACE THEM ON YOUR LAB BENCH.**

- 1. What is an acid?**
- 2. What is a base?**
- 3. What is pH?**

First Experiment:

- 1. Label 6 test tubes: tap water, soda water, vinegar, lemon juice, Pepsi, and distilled water.**
- 2. Fill up half your beaker with tap water.**
- 3. You will fill up your beaker with water $\frac{3}{4}$ full to wash off the forceps after every pH paper test when you test your solutions.**
- 4. Solutions are labeled in the beakers. DO NOT MIX THE DROPPERS FOR EACH FLUID. Load 12 mls of tap water, soda water, vinegar, lemon juice, Pepsi, and distilled water to each 6 test tubes and place them in the test tube rack.**
- 5. Use your pH paper to measure the pH of each solution. By using a forceps take a piece of the paper, place it in the solution you are testing, and look at the color of the paper and the color on the pH paper chart. Write down the pH measurement in your table. Go to the website and look at the color scale and match the pH number with the color to determine whether it is an acid or base, and write whether it is an acid or base in the table below.**

Insure you use a different piece of pH paper for each solution, and then after each use, rinse your forceps in the beaker of water.

6. Once you have tested all your solutions with pH paper then you will test with the Bromothymol Blue.
7. Load each test tube with 6 mls of Bromothymol Blue. Pick up the test tube and swirl around so that it mixes. Write down the color change in your table and the pH number, and note whether it is an acid or a base.
8. Rinse the test tubes completely about 5 times by filling with water and emptying. Dry off the outside with paper towel (keep towel for next experiment). Place the test tubes back in the rack.

Second Experiment:

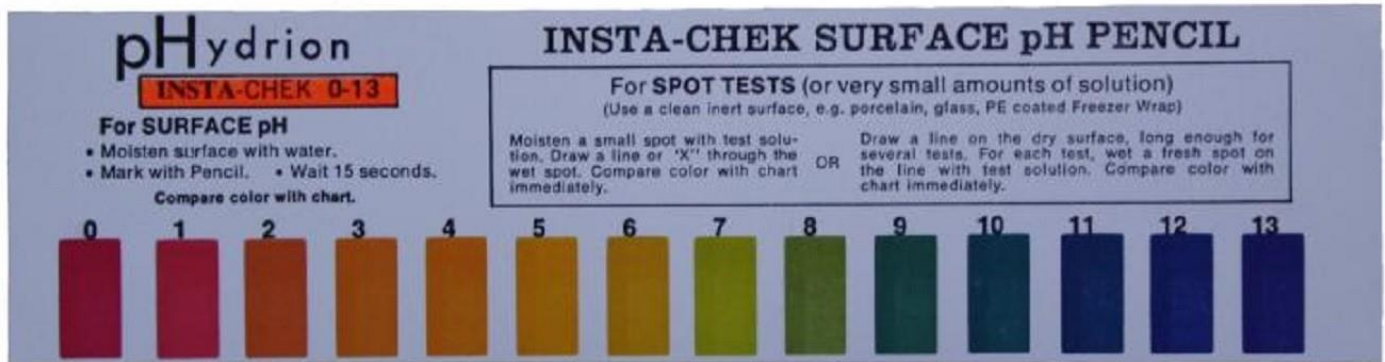
1. Label 6 test tubes: baking soda, ammonia, shampoo, bleach, Isopropyl alcohol, alka seltzer.
2. You will fill up your beaker with water $\frac{3}{4}$ full to wash off the forceps after every pH paper test when you test your solutions.
3. Solutions are labeled in the beakers. **DO NOT MIX THE DROPPERS FOR EACH FLUID.** Load 12 mls of baking soda, ammonia, shampoo, bleach, Isopropyl alcohol, alka seltzer to 6 test tubes and place them in the test tube rack.
4. Use your pH paper to measure the pH of each solution. By using a forceps take a piece of the paper, place it in the solution you are testing, and look at the color of the paper and the color on the pH paper chart. Write down the pH measurement in your table. Go to the website and look at the color scale and match the pH number with the color to determine whether it is an acid or base, and write whether it is an acid or base in the table below. Insure you use a different piece of pH paper for each solution, and then after each use, rinse your forceps in the beaker of water.
5. Once you have tested all your solutions with pH paper then you will test with the Bromothymol Blue.
6. Load each test tube with 6 mls of Bromothymol Blue. Pick up the test tube and swirl around so that it mixes. Use the Color Chart. Write down the color change in your table and the pH number, and note whether it is an acid or a base.

7. Rinse the test tubes completely about 5 times by filling with water and emptying. Dry off the outside with paper towel (keep towel for next experiment). Place the test tubes back in the rack.

Third Experiment:

1. There will be two test tubes on the back table labeled one Ammonia and one vinegar with a pH Probe and Vernier Labquest attached.
2. Turn on the Vernier Labquest and record the pH number of Ammonia and Vinegar on your table

Data Table - MEASURING THE pH OF SOME SUBSTANCES				
SUBSTANCES	pH Number from Vernier pH Probe	pH Number/Color (from pH Paper)	COLOR (Bromothymol Blue)	Acid, Base, or Neutral
tap water				
soda water				
Vinegar (Use for both Bromothymol Blue and pH sensor)				
lemon juice				
pepsi				
Distilled water				
Baking soda				
Ammonia (Use for both Bromothymol Blue and pH sensor)				
shampoo				
Bleach				
Isopropyl alcohol				
Alka seltzer				



pH PAPER CHART ABOVE

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Colour	RED	ORANGE	YELLOW	GREEN	BLUE	PURPLE-VIOLET								
strength	Strong	ACIDS			Weak	Neutral	Weak	ALKALIS					Strong	

BROMOTHYMOL BLUE INDICATOR SOLUTION COLOR CHART
 ABOVE

RESULTS: Class Discussion

1. What is an acid?
2. What is a base?
3. What is pH?