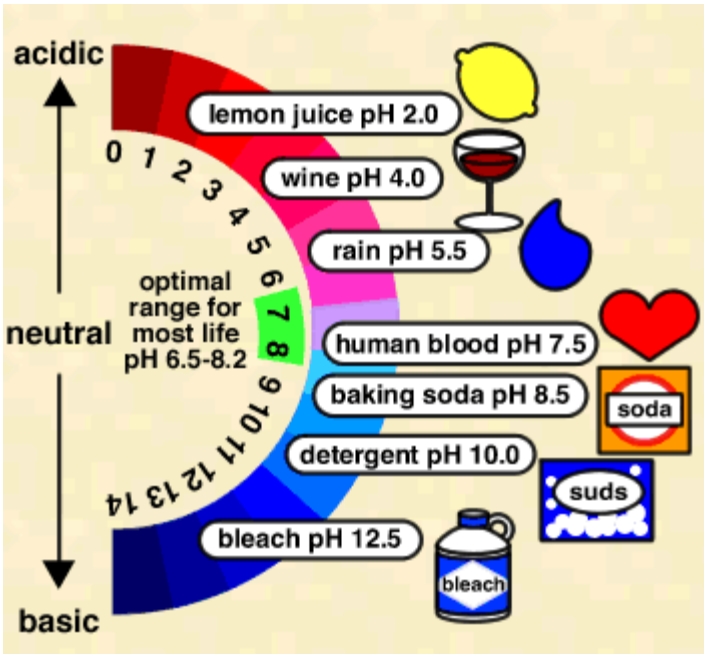

Acid-Base Lab
pH

Objective: Students will test a minimum of 15 different substances from "around the house" to determine their pH and then calculate the concentration of H_3O^{+1}.

Background: What is pH? pH is a measure of how acidic a substance is and actually stands for "power of hydronium ion." The pH range is from 0-14 where 0 is acidic and 14 is basic. Many personal hygiene products claim to be "pH balanced." If they are, what pH "should" they be? Other products you use around the house may be very corrosive (acidic) or caustic (basic). By making a solution of different products, you can easily test the pH. You can then convert the pH into the concentration of hydronium using the formula, $pH = -\log [H_3O^{+1}]$.

Materials:

- 15 household products to test (can be liquid or solid)
- Watch glasses
- Distilled water
- Stirring rods
- Disposable pipettes
- pH paper

Procedure:

1. Your watch glasses must be completely CLEAN before use. Rinse THOROUGHLY the watch glass with distilled water. Dry off with paper towel.
2. For solid substances, you will need to make a solution. Place a small amount of the substance onto the watch glass and add just enough distilled water to make a liquid solution. Use the glass stirring rod to mix the water with the solid substances. Proceed to step #4.
3. For liquid substances, use the plastic dropping pipette to place several drops onto a clean watch glass. Proceed to step #4.
4. Take some of the strips of pH paper out of the clear tube. Carefully SEPARATE them into individual strips. Do NOT use "double thick" pH paper!
5. Take ONE piece of pH paper from the vial and tear it in half. You will use one half to test one sample and the other half to test a different sample.
6. Dip one end of the pH paper into the sample. Match its color with the closest shade on the comparison chart. Compare the colors within 30 seconds. Record value on data table (back side of this page).
7. Dispose of the used pH paper in the TRASH.
8. Continue to test samples until done.

Data Table:

	Sample description	Observed pH value
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Analysis:

- You will make a mini-poster of your results. You will need to include **COLOR**.
- Create a table which is 4 columns wide and looks something like this. You must use a piece of printer paper that is the standard 8.5" x 11".

- MERGE cells on the left hand column. Using the "Drawing Toolbar," insert a double headed arrow. Label the headings and the pH column. It should look something like this now:

Basic / Acidic	pH	Substance	$[H_3O^{+1}]$
	14		
	13		
	12		
	11		
	10		
	9		
	8		
	7		
	6		
	5		
	4		
	3		
	2		
	1		
	0		

- How do you calculate the $[H_3O^{+1}]$? Using the equation, $pH = -\log[H_3O^{+1}]$, rearrange to isolate $[H_3O^{+1}]$ on one side of the equation. So, $[H_3O^{+1}]$ = antilog (-pH). Calculate the concentration of each sample and type it into the appropriate cell on your table. Be sure to include the units of M next to each value.
- You may decorate your poster in any way you wish. More points will be awarded to creative, neat and colorful posters.
- Glue a piece of colored construction paper (STANDARD SIZE of 9" x 12") to the back of your white table to give it a "framed look."
- Be sure all names of members of your group and your block are on the front of the poster.

Poster Grading Rubric:

Outstanding! Great creativity and neatness and all information is correct.		**25**
Good. Neat and all information is correct.		**20**
OK – met the basic parameters and all information is correct		**15**
Not so much. Some information is incorrect / directions not followed / kind of boring to look at.		**10**