

# **Acids and Bases**

*Courtesy of Katherine Poulin-Kerstien, poulin@caltech.edu  
Chemistry Activities from High Point Academy Science Fair (4-29-06)  
Target audience: K-6 grade*

- (1) Investigate the pH of some common liquids.
- Gather some common liquids (see below)
  - Pour a small amount of each liquid in a separate cup, labeled with the identity of the liquid
  - Ask the students to predict whether each liquid is an acid, base or neutral
  - Allow the students to use pieces of pH paper to determine the pH of each liquid. Explain to them that pH paper is an indicator and the pH scale is used to determine the pH of liquids.

<b>Acids</b>	<b>Bases</b>	<b>Neutral</b>
Soda (carbonic acid)	Baking soda (sodium bicarbonate)	water
Vitamin C (ascorbic acid)	Milk of magnesia (magnesium hydroxide)	
Lemon juice (citric acid)	Tums (magnesium bicarbonate)	
Vinegar (acetic acid)	Cleaning solution (ammonium hydroxide)	
Tea or wine (tannic acid)	Drain cleaner (sodium hydroxide)	
Milk/buttermilk (lactic acid)	Borax/detergent	
Aspirin (acetylsalicylic acid)		

- (2) Grape juice as a pH indicator.
- Have a student pour some grape juice into a baking soda solution. Notice the color change from a reddish-purple to bluish-purple/black.
  - Have student remember that baking soda is a base, and that indicators change colors in acids/bases.
  - Have student remember that vinegar is an acid. Ask them to predict what will happen when vinegar is added to the baking soda/grape juice solution.
  - Have student add a small amount of vinegar to the baking soda/grape juice solution. Notice the bubbles that form, and that the grape juice turns reddish-purple again.
- (3) Invisible Ink
- Have students use cue-tip dipped in dilute cleaning solution to write a secret message on a cue card. Emphasize that they should not be able to see their picture.
  - Have them wave the card to dry the "ink"

- Using a clean cue-tip, have the students rub grape juice all over the card to reveal their message.

(4) Poster for this booth.

- Students not very interested in poster, aside from pH scale. Parents more interested in reading poster.

**Acids** and **Bases**

- + Corrosive ("burns" skin)
- + Turn pH paper **RED**
- + Example: lemon juice

**Bases**

- + Corrosive ("burns" skin)
- + Turn pH paper **BLUE**
- + Example: cleaning solution

*Indicator* = changes **COLOR** when pH changes

- \* pH paper
- \* grape juice

pH paper is like a ruler → it measures the strength of an acid or base

pH	1	2	3	4	5	6	7	8	9	10	11	12
	acid			neutral				base				