

Measuring the pH of Some Common Materials

from **Celebrating Chemistry**



In this experiment, you will use test strips to measure the pH of some common substances. The test strips you will use have color pads with a chemical indicator. The indicator changes color when it touches an acid or a base. The color pad can be compared to a color chart to find out the pH of your sample. The scale starts at 0, which is very acidic, and goes to 14, which is very basic. A value of 7 is at the middle of the scale and is not acidic or basic. It is neutral. With an adult partner, you will measure the pH of some common substances and based on the pH value, determine whether they are acidic, neutral, or basic.

Materials

Masking tape

Pen

4 disposable plastic cups (3 oz.)

Measuring spoons

Distilled water

Vinegar

Baking soda

2 plastic spoons

3 pH test strips (pH range 0 to 14)*

pH test strip color chart

* This activity was conducted using pH strips made by Industrial Test Systems, Inc. 800-861-9712, <http://www.sensafe.com/index1.php>. Catalog #480104, but others should also work.

This statement does not imply endorsement by the American Chemical Society of Industrial Test Systems, Inc.



To read Milli's Safety Tips

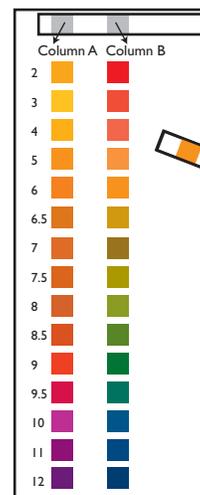
click here!



Be sure to follow Milli's Safety Tips and do this activity only with adult supervision! Participants must wear safety goggles to do this activity! Do not eat or drink any of the samples used in this activity! Liquid samples should be poured down the drain and solid waste should go in the trash.

Procedure

1. With your adult partner, use the masking tape and pen to label four disposable plastic cups. Label one cup "distilled H₂O", the second "H₂O + vinegar", and the third "H₂O + baking soda".
2. Carefully measure 3 table-spoons of distilled water into each plastic cup.
3. Add 1 teaspoon of vinegar to the cup labeled "H₂O + vinegar". Gently swirl the cup to mix the liquids.
4. Add 1 teaspoon of baking soda to the cup labeled "H₂O + baking soda" and stir with a plastic spoon to dissolve the baking soda.
5. Open one pH test strip at the end labeled "OPEN".
6. Carefully place the test strip into the "distilled H₂O" cup, so that the end with the colored pads is completely in the distilled water.
7. Slowly move the test strip with a back and forth motion for 10 seconds.
8. Remove the test strip from the sample, shake off excess liquid, and place it flat on the table with the colored pads facing up for 20 seconds to allow the color to develop.
9. Compare the color of the pH test strip with the color chart that came with the test kit. Record the pH value (the number on the chart next to the color that matches most closely) in the "What Did You Observe?" section.
10. Determine whether the pH value indicates that the sample is an acid (less than 7), a neutral (7), or a base (greater than 7) and record it in the "What Did You Observe?" section as well.
11. Repeat steps 6–11 with the two remaining samples and record your results in the "What Did You Observe?" section.
12. Thoroughly clean your work area. Pour the liquids down the drain and throw away any other trash. Be sure to wash your hands.





What Did You Observe?

Cup Contents	pH value	Acidic, Basic, or Neutral
Distilled H ₂ O		
H ₂ O + vinegar		
H ₂ O + baking soda		

Where's the Chemistry?

Not all liquids are the same. In this experiment, you tested some common substances to see if they were acidic, basic, or neutral. Distilled water is neutral and should give a pH value very close to 7. Vinegar contains acetic acid, and your pH test strip should have given you a value of about 3. The baking soda is a base and your pH value should have been around 8 or 9.

The chart below shows you the pH values for some common materials. You may recognize many of these materials. Acids are used in foods to add flavor, or give food a "tangy" (slightly sour) taste. Acids can help to preserve food, or to keep the food fresher for a longer time. Some bases, like baking soda, are used with acids in cooking. Baking powder has both an acid and a base that react with one

another in biscuit dough to make it rise. Acids and bases are not only found in foods. Bases are commonly found in cleaning solutions like window washing liquid or laundry detergent. Very strong acids (pH = 1 or less) and very strong bases (pH = 13 or more) can burn our skin and our eyes. Really strong acids and bases should only be handled by adults.

pH of Some Common Materials

