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## *The Connecticut Agricultural Experiment Station*

123 HUNTINGTON STREET, P.O. BOX 1106, NEW HAVEN, CONNECTICUT 06504

*Putting Science to Work for Society  
Protecting Agriculture, Public Health, and the Environment*

# The Connecticut Agricultural Experiment Station Soil pH Experiment

Gregory Bugbee  
Department of Environmental Sciences

Michael Cavadini  
Department of Analytical Chemistry

### **Introduction**

Soil pH affects the availability of nutrients to plants. pH is a measure of hydrogen ion concentration and ranges from 0 to 14. A pH of 7 is neutral while a pH below 7 is acidic and above 7 is alkaline. The pH scale is logarithmic with each unit 10 times more acidic or alkaline than the next. Most soils in Connecticut are naturally acidic due to their mineral make-up and the abundant rainfall that leaches out alkaline components. Most plants prefer a soil pH from 6.0 to 7.0. A few plants such as blueberries, mountain laurel and azalea grow best in a more acidic soil with a pH range of 4.5 to 5.0. A variety of kits and devices are available to determine soil pH. These devices usually consist of dyes, paper strips or electronic pH meters. The following experiment uses paper pH indicator strips to determine soil pH.

### **Materials**

- Five one quart zip lock bags
- Five 3 ounce wax paper cups
- Stirrer
- General Range pH Indicator Paper (available from Fisher Scientific or other scientific supply distributor)
- Specific Range pH Indicator Paper (available from Fisher Scientific or other scientific supply distributor)
- Deionized (DI) Water

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## **Procedure**

Obtain soil from five very different sites. Examples are a lawn, a forest, a garden, a farm, a vacant lot, an abandoned industrial complex etc. From each site use a shovel or trowel to take soil slices six inches deep from several spots. Mix these slices together and place ½ liter of the combined site sample into a plastic bag. Label the bag.

Create a data sheet and record the sample sites in one column. In another column use your best judgment to predict the likely soil pH. This can be based on site characteristics, plants growing in the area, wetness etc. Create a last column to record the results of your actual pH test. Label a three ounce plastic cup and fill it ¾ full with each site's soil. Add DI water until it just covers the soil. Stir the soil sample with the stirrer until it is well mixed. Take a general indicator paper (pH 0 to 14) and dip the end with the four squares into the mixture. Using the colored panels on the indicator paper box, record the approximate pH of the mixture. Then, using this approximate pH as a guide, use the appropriate specific pH range indicator paper and test the mixture once again by placing the unmarked band of the indicator paper into the soil mixture. Using the colors located on the band, determine and record the pH of the mixture. Record the final result on a data sheet. Repeat these steps for each site.

*Note:* When testing the pH of a soil and water mixture with pH paper, be careful not to cloud the resulting color of the paper with the suspended soil particulates. Dip the paper slowly into the mixture one time only to avoid a cloudy reading. If a reading is cloudy, discard the paper and try again with a new strip (never reuse pH paper).

Bring or mail one cup of each site's soil to a qualified soil testing laboratory (see address below) and compare the laboratory results to yours. Explain possible reasons for differences. Theorize the reason behind each site's pH.

Soil Testing Laboratory  
The Connecticut Agricultural Experiment Station  
123 Huntington Street  
New Haven, CT 06511  
[www.ct.gov/caes](http://www.ct.gov/caes)

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