

Activity name: pH Studies

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts identified by ATEEC Fellows as necessary preparation for environmental technology occupations.

Appropriate for which course(s)? High school sciences: Physical Science, Chemistry, Biology, Integrated I, II, III. Possible community college courses in Environmental Studies and Chemistry.

Concept/skill learned (i.e. from K/S Tables): Perform the following analyses according to standard procedural methods: pH, define and determine. Read and follow lab procedures. Appropriately label samples and reagents. Collect data.

SCANS:

Cognitive Level: Application analysis

Learning Objectives: The student will be able to test for the pH of liquids and compare it to a known pH scale.

Approximate time to complete activity: Variable: 1 class period to a term project.

Source of idea or activity (for published source, please include author, title, publisher, date): Brainstorming session with other teachers, readings.

Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.): pH paper or meter (should read at least a difference of one pH point--0.1 differences are preferable). Small quantities of household products such as shampoo, hair spray, mouthwash, window cleaner, etc.

Prerequisite: Calculation of pH meter (if used).

Description of activity:

Notes to teacher: This activity can be done on many levels. Starting with the simplest level: Initial sampling could involve shampoos, soaps, soda, vinegar, baking soda, etc., which can be tested in the lab so that students demonstrate correct use of equipment. If a meter is used, calibration skills must be taught. Environmental testing could involve samples collected and brought in by students or samples collected and tested outdoors on site. These samples could involve testing local streams, wells, ponds, lakes, storm water, etc. More advanced students could test sites that have been bioremediated or areas

containing treated industrial effluent alone or in conjunction with other hazardous materials studies.

Related studies: Acid rain and its effects. Develop new quality standards for water, air, etc.

Extension activities:

1. Obtain several samples of household liquids.
2. Take a small piece of pH paper and touch it lightly to the sample surface and remove.
3. Compare the color on the tip of the paper to the color chart provided by the paper manufacturer. Record pH as indicated.
4. If using a pH meter, lightly dip the probe into the liquid; read the meter; record the reading.
5. pH can be tested at various sites around school (i.e., water faucet, standing water in puddles, ditches, or in drains).
6. Students should design and construct a pH scale or graphic which lists the various household liquids and describes their pH.
7. Students should compare household liquid pH's to outside pH's recorded.

Assessment: Given an unknown liquid, test the pH and identify where it would be found on the class developed pH scale.

Activity submitted by: Robin Ritter

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