

Community Chemistry

Students were motivated to learn difficult concepts of equilibrium and acid base reactions. Students developed a strong sense of how chemistry relates to their everyday world through the investigation of chemical reactions and concentrations in the environment or in their drinking water.

Curriculum/State Standard

- State Science Content Standards - Unifying Concepts and Processes
- State Scientific Inquiry Curriculum Goals

Project addresses specific content in chemistry such as concentration, rates of reaction, equilibrium, acids and bases, and the development of scientific investigations.

Overview

Students developed an experiment to determine the concentration of a few chemicals in the environment, drinks, or other water sources. They developed a Web page report that provided background about the importance or danger of the ion, and they predicted factors that would influence these concentrations. Students conducted their measurements and explained their findings in their Web page report.

Objectives

- The student will work with community members, scientists, or teachers to develop and interpret investigations based on chemical processes in the environment.
- The student will learn and apply the concepts of chemical concentration and equilibrium.
- The student will develop skills in interpreting graphical and statistical data.
- The student will develop collaboration and communications skills.
- After working in the field, the student will demonstrate an understanding of how ideas from science relate to solving real world problems.
- Based on a partnership with an adult mentor, the student will develop connections between this course and possible science careers.

Continued on the back...

10-12

GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

1

MONTHS

\$1000

TOTAL BUDGET



THIS WINNING LESSON PLAN WAS SUBMITTED BY:

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“Community Chemistry” continued...

Materials

Students need sensors that allow the measurement of ions in solution. In addition, several students chose to measure the pH of their samples using similar probes.

Students need consistent access to computers to analyze the findings and to create their Web page reports. Students used a Web page creation program for their final report.

Readiness Activity

In previous units, students studied concepts of measurement, balancing reactions and factors influencing the rate of reaction. An essential step building toward this project was an experiment in which students developed their own procedure to test the effects of temperature or concentration on the rate of a chemical reaction.

Strategies/Activities

After an introduction to the basics of chemical concentration and equilibrium, students brainstormed ideas for ecological systems that are important and accessible for study. As an initial step, students conducted interviews with community members and professional researchers in the area to establish likely candidates for research. Based on this research students chose several topics:

- a) research the effects of construction on the amount of sediment in a neighboring stream
- b) investigate the seasonal changes of dissolved oxygen or other chemicals in a local creek

- c) check the nitrate or ammonium ion runoff from fertilized sports fields after a storm (look for a correlation between animal population levels and concentrations of key chemicals)
- d) study the amounts of key ions in energy drinks or bottle water and explain the reasons for these differences and the effects of these ions on the body

After continued work with teachers, community members and other professionals, students gathered data on the amounts of chemicals present in different systems. They analyzed and interpreted their data for presentation in two forms. (see below)

Culminating Activity

First, each team presented their findings to a panel of adults that included peers, consultants, and community members. Based on the final critique, each team finalized their Web page report for publication on the school Web for the community to view.

(<http://clackhi.nclack.k12.or.us/physics>)
- projects will be available in late June)

Evaluation

The quality of each scientific investigation was assessed using the Oregon State Scoring Guide for Scientific Inquiry. The Web page reports were graded by a rubric based upon the writing scoring guide developed by the State of Oregon. Throughout the project, students kept a journal that prompted them to discuss and reflect upon their experiences. This was an important tool for gauging the connections that students made between science, the environment, and career options.