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Lesson Title:

International Acid Rain Study

Subject Area:

Earth Science

Grade Level:

k-6

Lesson Summary:

Students will use the internet to research information about acid rain, solicit schools around the world to contribute data, and compile that data to find out acid rain levels throughout the world. Students will then display their findings on the World Wide Web using a webpage design program such as FrontPage or Claris Homepage.

Objective/Content Standard/Benchmark:

(Science- grade 8) 1. Students will describe, in simple terms, chemical reactions such as burning, rusting, baking soda reacting with vinegar 2. Ask relevant questions about objects in the world 3. State questions narrowly enough so that they can be answered through investigation, but broadly enough so that the results will be meaningful. 4. Recognize and seek information from reliable resources, including prior scientific knowledge, observation and experimentation 5. Recognize the importance of the basics of experimenting such as controlling variables, quantifying results and observing objectively. 6. Generate summary statistics such as mean, mode, median, maximum and minimum to aid in the analysis of data. 7. Differentiate between description and explanation. 8. Represent data in multiple ways 9. Organize data to produce the clearest report or strongest evidence 10. Identify the best type of graph to use to illustrate data.

Approximate Time Needed:

9 months

Prerequisite Skills:

Knowledge of the internet (searching, using the WWW, producing webpages, use of spreadsheet)

Materials and Resources Required:

Technology:

Computer with internet connection, Webpage design program (MS FrontPage, Claris Homepage), Encarta, Bookshelf, library materials, Internet Explorer,

Printed Materials:

Supplies:

Others:

Procedures:

1. Have students research acid rain topics and information. There are several good sites available for this information. · <http://glink.queensu.ca/~4lrm4/> - "The ABC's of Acid Rain" · <http://www.epa.gov/acidrain/student/student2.html> - "Acid Rain: A Student's First Notebook" (this site has an especially good section on how to measure pH) · <http://www.geocities.com/RainForest/Vines/7050/index2.html> - "Persephone's Acid Rain Page" · <http://www.soton.ac.uk/~enginvir/environment/air/acid.home.html> - Acid rain from Britain 2. Students will be responsible for gathering information/research on the following topics regarding acid rain. · What is acid rain? What components make the rain "acidic" · What type of activities produces acid rain? · Where does acid rain originate? Is it human-caused or is it a natural event? · What are the effects of acid rain on forests, man-made objects, health, water, animals? · In which parts of world is acid rain most prevalent? Why? · How can someone measure acid rain at home? · What, if anything, can humans do to alleviate acid rain? · The components of acid rain are often labeled "CO₂" or something of that nature. Explain the letters and the numbers and why they are in capitals and subscript. · Describe ways that humans combat acid rain at in their homes. (Example; people may wax their autos more often to prevent the rain from ruining their paint) 3. After gathering the information, students will write a report telling of their findings. This report will be in Microsoft Word of some other word processing form. If possible, students will save their reports in .html format, so that their research can be shared over the World Wide Web. 4. Students will then divide into small groups to research acid rain levels in their town and levels in other cities. Prior to this, the class will be instructed on how to measure pH in water using various methods (litmus paper, cabbage water, etc.). The cabbage water test may be obtained from the EPA's website and from various other sites on the WWW. 5. Groups will then proceed to recruit other schools from around the world to contribute their findings to the class's findings. Groups will recruit individuals/classes from either the Yahoo!igans or the Global SchoolHouse. Groups will need to succinctly describe their project. They will need to describe the gathering of water, dates when the gathering is to be conducted, types of water, where and how to contribute data, and any other parameters that the groups deems necessary. It will be mandatory that students try to recruit from as diverse selection as possible. For example, it would be best if samples from each continent were to be collected. 6. Students will construct a website where information will be gathered. This will be done in a forms-type format and information will be sent to the group. Information should be gathered over time, rather than in a "one-shot" format. Information may be gathered monthly, bi-weekly, or weekly. Students will compile

information in a spreadsheet, such as Microsoft Excel. 7. Students will then collate their data in a spreadsheet. From there, they will be able to make generalizations about such things as. 1. Which continents have a higher level of acid rain? 2. Is acid rain higher around cities or rural areas? 3. Are consequences of acid rain the same from one country to another? 4. What is causing the acid rain in a given area? 5. Does time of year/day influence the levels of acid rain? Why? 8. Upon completion of the exercise, students will create charts, graphs, and table displaying the information that was gathered. Publication of this information will be shown on the World Wide Web. Contributors will be notified of the findings and the URL where the results may be viewed.

Modifications for Differentiated Instruction:

For the special needs student:

For the gifted student:

Student Assessment:

Using rubrics (to be determined by the class and teacher) for science and writing, students' final report will be judged for clarity, thoroughness, and accuracy.

Lesson Evaluation:

The assessment for the lesson will be determined by the students' enthusiasm for the project, along with the knowledge gathered. The homepage that will present the results will further show the lesson's success or failure.

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