ACID RAIN

Introduction

Why are the trees dying? How come there are no fish in the lake? Why does the paint on my Dad's car look so bad? Where does that terrible rotten egg smell come from in our school yard every Spring? The answer to these questions is simple; acid rain is responsible for many of the serious environmental problems facing us today. While the answer may be simple, solving the acid rain problem is not.

The Task

A local citizens' group has hired you, and a group of other researchers, to investigate acid rain. You will take on the role of either a Chemist, Ecologist, Health Scientist, or Economist and examine the issue from that perspective. Working within this team, you will create a web site detailing the problems caused by acid rain and recommending ways that these problems can be alleviated.

Within your group, decide who is going to assume the following roles. Use the questions appearing under each role to assist you in your research. While you are responsible for completing your section of the report, you will also be responsible for drawing up a series of recommendations, along with the other members of your team, on how to combat this serious issue.

CHEMIST

● What is acid rain?
● What chemicals make rain acidic, and how does it happen?
● Where do these chemicals come from?
● How do we measure the acidity of rain?
● What is pH?
● Describe the pH range and list various things that correspond to the various pH levels.
● What is the pH of normal rain, and at what level does the pH become dangerous?

BIOLOGIST

● What effect does acid rain have on trees and soil?
● How does the effect of acid rain on trees and soil affect us?
● What happens when lakes and aquatic systems become acidic?
How does acidic water systems affect us?

- Are the aquatic systems in our area being affected by acid rain? If yes, to what extent?
- What are the danger signs of the effect of acid rain on aquatic systems?

**HEALTH SCIENTIST**

- How does acid rain affect humans?
- What are some of the direct effects of acid rain on humans? Are there any health problems associated with acid rain?
- What are some of the indirect effects of acid rain on humans? Does acid rain affect our sources of food, water, and air.
- What are the consequences of the effects of acid rain on people?

**ECONOMIST**

- Does acid rain affect building materials?
- Does acid rain have an effect on architecture?
- What does acid rain do to our roads, highways, and bridges?
- What is the effect of acid rain on things made from metal such as automobiles, trains, buses, and other means of transportation?
- What does the effect of acid rain cost us in terms of money?
- What are the economic consequences of acid rain on fisheries, forestry, and agriculture?

While you are researching your particular area of concern, look for solutions to the problems caused by acid rain. While the final section of your report, the recommendations, will be drawn up by the entire group, you must be prepared to offer solutions in your specific area of concern.

**Web Resources**

<table>
<thead>
<tr>
<th>ACE On-Line Fact Sheets - Air Quality and Acid Rain</th>
<th>EPA Acid Rain Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid Rain</td>
<td>Acid Rain Links</td>
</tr>
<tr>
<td>The ABC's of Acid Rain</td>
<td>Environment Canada - Acid Rain Homepage</td>
</tr>
<tr>
<td>Make a Cabbage Juice pH Indicator</td>
<td>Acid Rain</td>
</tr>
<tr>
<td>Encyclopedia of the Atmospheric Environment</td>
<td>The National Park Service</td>
</tr>
<tr>
<td></td>
<td>Acid Rain - What is it and How is it Measured</td>
</tr>
<tr>
<td></td>
<td>(temporarily out of service)</td>
</tr>
</tbody>
</table>

**The Process and Learning Advice**

The end product of this webquest will be the creation of a "web report" detailing the causes and effects of acid rain. Each "scientist" will be responsible for his/her section of the report while the recommendations and conclusions will be arrived at through the cooperative efforts of the entire group.
group that you are working with.

1. Get together with the other members of your group and decide who will assume the responsibilities of each of the four roles. Do some "brainstorming" on acid rain in order to come up with ideas for the focus of your "web report". Develop a plan of action to determine the organization, contents, and "look" of your web report. Know your main objectives and devise an outline of all the information your site will contain.

2. Using the sites listed in the Resource section, begin to research your project. Locate the information necessary to answer the questions listed under your role in the Task section. As you will be creating a web report, find some pictures that you can use to help illustrate the causes of acid rain and the problems that it creates.

3. Take notes as you do your research. Bookmark any sites that you find useful so that you can refer to them again quickly if necessary. Keep in mind the rules defining plagiarism. Plagiarism occurs when you steal or use the ideas or writings of another and present these writings or ideas as your own. You are not allowed to borrow passages from books, or articles, or Web sites without identifying them.

4. After you have completed your research, begin writing the first draft of your report. Make sure that you introduce your section so that the reader knows what you are writing about. Remember that you are writing a report about the problems caused by acid rain and not just a set of answers to a series of questions. Be aware of the reader - just because you understand what you are writing about doesn't mean that the reader does.

5. Once each "scientist" has completed his/her section, meet with your group and present your draft findings. This is the time that you can ask the other members of your group for advice on revising your writing. Write your final draft.

Decide, as a group, what is your position on acid rain. Determine the recommendations and conclusions that your report will present. Determine which members of the group will be responsible for writing this section, and which members of the group will put all the pieces of the report together.

Conclusion

After having researched and written your report on acid rain, you should have a much clearer idea of the problems caused by this phenomenon. However, being aware of the problem is not enough. Perhaps you may feel that we should be doing more in solving this environmental issue. A good starting point would be to write a letter expressing your concerns to your Member of Parliament in Ottawa or your Member of the National Assembly in Quebec City.

Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>Developing</th>
<th>Accomplished</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Research &amp; Gather Information</td>
<td>Does not collect any information that relates to the topic.</td>
<td>Collects very little information--some relates to the topic.</td>
<td>Collects some basic information--most relates to the topic.</td>
<td>Collects a great deal of information--all relates to the topic.</td>
</tr>
<tr>
<td>-------------------------------</td>
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<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Fulfill Team Role's Duties</td>
<td>Does not perform any duties of assigned team role.</td>
<td>Performs very little duties.</td>
<td>Performs nearly all duties.</td>
<td>Performs all duties of assigned team role.</td>
</tr>
<tr>
<td>Share Equally</td>
<td>Always relies on others to do the work.</td>
<td>Rarely does the assigned work--often needs reminding.</td>
<td>Usually does the assigned work--rarely needs reminding.</td>
<td>Always does the assigned work without having to be reminded.</td>
</tr>
<tr>
<td>Introduction</td>
<td>No information given as to what to expect in report.</td>
<td>Some information given as to what to expect in report.</td>
<td>Adequate information given so that reader is aware of what report is about.</td>
<td>A very concise introduction which shows that the writer is very aware of the reader.</td>
</tr>
<tr>
<td>Role</td>
<td>Does not answers any of the questions assigned to the role in the WebQuest.</td>
<td>Answers some of the questions assigned to the role in the WebQuest.</td>
<td>Answers most of the questions assigned to the role in the WebQuest.</td>
<td>Answers all of the questions and includes many interesting facts.</td>
</tr>
<tr>
<td>Task</td>
<td>Does not detail problems caused by acid rain but offers no recommendations.</td>
<td>Details some problems caused by acid rain but offers some recommendations.</td>
<td>Details many of the problems caused by acid rain and offers some recommendations.</td>
<td>Details many of the problems caused by acid rain and offers many recommendations.</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Presents no explanation of research.</td>
<td>Presents an explanation of research but tends to be confusing or unclear.</td>
<td>Presents a logical explanation of research and some possible solutions.</td>
<td>Presents a superior explanation of research and offers many possible solutions.</td>
</tr>
<tr>
<td>Conventions of Print</td>
<td>Very frequent grammar and spelling errors which makes the writing impossible to understand.</td>
<td>Frequent grammar and spelling errors which make the writing difficult to understand.</td>
<td>Grammar and spelling errors do not detract from understanding the writing.</td>
<td>Grammar and spelling errors are infrequent, and writing is clear.</td>
</tr>
</tbody>
</table>

**Student Work:**

- [An Acid Rain Newsletter](#)
- [An Acid Rain Web Page](#)

The Acid Rain WebQuest was featured in the March, 2001 episode of [NetFiles](#). View the episode by clicking [HERE](#). [RealPlayer](#) must be installed to view the episode.

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