Teaching in the Science Classroom with the World Wide Web

There are many possible ways to incorporate the use of the Web into the science classroom. This is true whether the instructor has an active connection in the classroom or not. Of course, it can be more of an adventure and more fun if the instructor has the capability of allowing all the students to actively work on the Web. The World Wide Web can be thought of as a huge library of science resources that can be used for research or interaction. Users of the Web will need to learn to discriminate between what is useful and accurate and what is not. We present here a few ideas for what can be done with the Web in the science classroom.

❁Portfolio

Students may write two-page papers to be included in a portfolio. Research can be done on the Web for papers and students should be encouraged to make proper citations in their references (see http://www.apa.org/journals/webref.html). Students may write about the life of a scientist or find home lab directions to write the results of experimenting at home (see Beakman's World or Newton's Apple.)

❁Class web-zine

The students are divided into teams to work on different aspects of a topic. As the students write about the information they find, take pictures and video, and make drawings, they add this to a class magazine located on the Web. As each week of the unit passes, the table of contents grows as the class adds more information. The class could invite other classes to visit the "web-zine" and correspond about it.

❁Problem sets

Questions can be posted on a web page as homework assignments or practice tests. With the use of a special script and cgi-bin directory, students can send their answers to the instructor by filling out an on-line form.

❁Discussion forum

Various forum formats exist which can be set up for on-line discussion of class topics. The instructor may assign using the forum similarly to journal writing. In this mode, everyone in the class will see each others' reflections. Each student may be required to post messages a certain number of times during the semester or a single student may be assigned each week to stimulate and lead discussion. See http://courses.forum.ncsu.edu/cgi-bin/netforum/sciteach/a/1 for an

example.

❦Cooperative experiment

Students at different locations can do a laboratory at the same time and compare the results through the use of web pages. See Water What-ifs at Science Junction for an example (http://www.ncsu.edu/sciencejunction/depot/experiments/water/)

❦Talk to a scientist

Several sites provide a practicing scientist for students to talk to or ask questions. The following are examples: Physics 2000, Smithsonian, VIMS, GLOBE Project, Scientific American.

❦Printed web pages

With the use of a color printer, the instructor can bring web pages into the classroom as overheads or bulletin board items. Data sets or graphic images are examples. This can help students with limited access to get a feeling for what is on the web. In addition, programs such as Web Buddy or Web Whacker enable the harvesting of websites to display on a computer without a live Internet hookup.

❦Compare your region to another region

Students can collect gravitational field strength or sun shadow data and periodically check their results against results posted on the Web for other locations.

❦Worksheet

The instructor writes a web page which gives the web sites to visit for the lesson. The students are given a worksheet with questions to answer. The students' job is to visit the given websites to read and find answers to the worksheet questions. This activity is timed.

❦Scavenger hunt

The instructor writes a question sheet for the students. This could contain review questions for a unit already finished or questions to begin a unit. It could contain questions from several units to use as an advanced organizer at the beginning of a quarter or semester. The students may use any search engines they wish to find the answers to the questions. They must give the answer in complete sentences and provide the URL of the page on which they found the answer (for an example, see the 1997 Science Olympiad at http://www.ncsu.edu/science_house/olympiad/.) The instructor may wish to provide the students with keywords to use in their searching. This activity can be used to find science facts but could also be

used to bring in biography, history, and culture for a multidisciplinary experience.

❧Virtual field trips

Many sites on the web contain photographs, quicktime movies, and quicktime virtual reality movies. Students can visit a research lab, a museum, a national science center, or a remote location (such as the surface of Mars) to have a virtual experience.