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Assignment 6

SEYS 753—Computer Applications in Science Education

Professor Murfin

Title of Lesson:

Don't Drink the Water!

Topic: Water quality and waterborne parasites.

Grade level/s: Grades 9-12: Living Environment. (Easily adaptable to Middle Levels.)

Time needed: One 45 minute period.

Science background for the teacher:

The teacher should possess some background knowledge in water quality, waterborne disease and parasites, specifically *Cryptosporidium parvum*. Needed information can be accessed using the links provided on the companion website to this lesson. It is suggested that the teacher become familiar with each of the links and the information provided there. In addition, the following provides an excellent introduction to Cryptosporidiosis:

<http://www.stanford.edu/group/parasites/ParaSites2005/Cryptosporidiosis/index.html>

Science background for the student:

The student should possess background knowledge in protozoan life and reproduction cycles, the importance of clean water to homeostasis, and global impact of disease.

Instructional Objectives:

- ✓ Students will be able to access, organize, and analyze information about water quality, water usage, and waterborne parasites (*Cryptosporidium parvum* and others) using the Internet.
- ✓ Students will be able to present their findings in a video episode or pamphlet.

Standards:

National Science Education Standards,

Content Standard F: Science in Personal and Social Perspectives

“An important purpose of science education is to give students a means to understand and act on personal and social issues” (107).

As a result of activities in grades 9-12, all students should develop understanding of

- Personal and community health
- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

NY State Standards:**Key Idea 1**

Major Understandings

- 1.2a Inquiry involves asking questions and locating, interpreting, and processing information from a variety of resources.

Key Idea 5

5.2 Explain disease as a failure of homeostasis

5.2a Homeostasis in an organism is constantly threatened. Failure to respond effectively can result in disease or death.

5.2b Viruses, bacteria, fungi, and other parasites may infect plants and animals and interfere with normal life functions.

Materials:

Computer projector

Computers with internet access and print capability for pairs of students

Video worksheets

Research organizer worksheets

Procedure:

Mini-lesson (Exploration of phenomena):

1. Teacher will initiate a brief discussion of the television show, House, and discuss how scientists work.

ASK: How does House and his team approach a problem? How often is House wrong per show? Why isn't his first diagnosis always correct? Describe the steps you would use to diagnose a strange illness.

2. Distribute video worksheet and research organizer to pairs of students.
3. **Motivation:** Show students the video. Students should complete the video portion of the worksheet while viewing.
4. After viewing, teacher will lead a discussion of what was learned.
ASK: How could we find out if Hoof's diagnosis is correct? What do we need to know?

Work Period (Introduction of terms and concepts):

5. Distribute computers to pairs of students and direct students to the companion website where they can access the video for review. Introduce the features of the site and how to access information. Students should complete the research organizer for *Cryptosporidium parvum*, following the website links.

Closing:

6. Share your findings...Was Hoof correct? How do you know?
7. Introduce the next lesson in which students will research one of the top 5 causes of Recreational Water Outbreaks listed by the CDC. Students will write a script for the next episode of "Hoof" or create an informational pamphlet to be distributed to the public. (Introduction of the concepts in different and new situations)

Adaptations for students with disabilities:

- Increase time for video viewing: Pause the video, discuss each segment as a class, then allow students to complete the related section of the worksheet.
- Allow extra time so that students can watch the video again.
- Allow students to work in pairs when researching on the internet. Pre-determine pairs based on weaknesses and strengths.
- Allow students to work in larger groups, help students split-up the work by assigning a small portion of the research for each student to complete based on ability.
- Add sub-titles to the video or distribute hard copies of the script for the hearing impaired.
- Allow students to create an informational poster by drawing their findings.

Multicultural Connections

Ask students if they have relatives living in other countries.

Allow them to research water quality issues in a country of their choosing.

Possible ways technology might be incorporated:

Virtual water testing activities.

Actual water testing activities using pH meters and water quality testing kits.

Graphing pH of water samples using graphing programs.

Video cameras and editing programs for student versions of Hoof episodes.

Corel draw or scratch videos instead of Hoof episodes.

Assessment:

Collection and grading of accuracy and completion of video worksheet and research organizer.

Assessment of Hoof episode or pamphlet using a rubric.

Extension Activities:

Students can test the water at different locations in the school and in their community and present their findings to the class.

Students can research global programs conducted by the World Health Organization and report on the effectiveness of current measures being taken in other countries.