Grade Level:
10th Grade

Subject:
Biology

Exhibit:
#10 Water Management

Approximate Time Frame:
2 hours *(more than one class period)*

Materials:
cultured water samples for demonstration on covered Petri dishes and regular tap water

Lesson Plan - Something's In My Water

Science TEKS:

1. A Demonstrate safe practices during field and laboratory investigations.
1. B Make wise choices in the use and conservation of resources and the disposal or recycling of materials.
2. A Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.
2. C Organize, analyze, evaluate, make inferences, and predict trends from data; and
2. D Communicate valid conclusions.
3. C Evaluate the impact of research on scientific thought, society, and the environment;
3. D Describe the connection between biology and future careers;
3. E Evaluate models according to their adequacy in representing biological objects or events; and
4. C Compare the structures and functions of viruses to cells and describe the role of viruses in causing diseases and conditions such as acquired immune deficiency syndrome, common colds, smallpox, influenza, and warts; and
4. D Identify and describe the role of bacteria in maintaining health such as in digestion and in causing diseases such as in streptococcus infections and diphtheria.

Related TEKS: Environmental Science, Chemistry, Aquatic Science

Vocabulary of Instruction:

microbes	bacteria
water purification	coagulation
sedimentation	filtration
disinfection	

Advanced Preparation: Culture about five water samples from the Rio Grande or other nearby running water source.

Instructional Procedure (5 E)

Engage: The teacher will pass the Petri dishes (tap water versus river water) around the class for observation. The students will inquire about what has been cultured on the plates or test tubes. Students will generate their own questions and record observation in their laboratory Journals. The teacher should not tell the students that this is culture from water at this point.

Explore: The teacher will inform the students that they have observed a culture of water from the named source (ex. Rio Grande) and a sample of tap water. Next, students should be split up into groups of 4.

Each student will have one of the following tasks:
Recorder (records discussion). **Supervisor** (encourages participation from every member). **Presenter** (presents the outcome of the group to the class). **Materials manager** (picks up and puts the materials away for the group). Students will observe a wet mount of the culture through the microscope.

Explain: The student groups will be given the water purification steps "cut-outs" and the students will be asked to put them in order from beginning to end.

Once the group has agreed to the proper order of purification process, then the teacher will pass out the KEY. At this point students have the opportunity to discuss and question why certain steps may be in the order that was specified. Possible points of discussion may involve: Why is it that we don't get sick if there are microbes in the water? If chlorine is a poison, why do we put it in our water? Are all microbes harmful? *This is a leading question, hopefully answer. In above question, why don't we get sick if microbes are in the water?*

What are the alternatives to chlorine?

What kinds of products are available to hikers who need to occasionally drink river or lake water?

Elaborate/Extend:
Groups will discuss and record their observations. The teacher will ask them to share one of these with the class.

A Where in El Paso might you find the most water pollution? Why?
B What kind of an impact would a flood have on the water in that area? (It depends on the ecosystem that surrounds that area)
C What are the different forms of water pollution that may occur in this area of El Paso?
D Explain why we may have pollution that can not be controlled by the City of El Paso? (Rio Grande area ….Juarez)

Evaluate:
Students will reflect in their Science journals on the following questions.

Why is water purification important?

Tap water may still contain a bit of bacteria. Explain why it may not cause us to become ill.

In your own words explain one way to purify water.