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Lesson Plan Title: Water We Live In	State: TX
Lesson Time Frame: 3 90-minute classes	Inspired by an Earthwatch Expedition: Brazil's Tucuxi Dolphins
Student Level: High School	

The lesson I am incorporating into my curriculum is based on the water quality tests I used on this expedition. Students will learn how to perform these tests, analyze the results to identify factors affecting water quality, as well as compare and contrast several different aquatic environments. An extension to this lesson will be to have them develop a plan to improve water quality in their area.

Each year this lesson will reach about 150 students in my classroom. The more teachers I share this with, the more students it will reach. My Earthwatch volunteer team used water quality data to determine what type of water the Tucuxi dolphins prefer as well as what quality of water they were "forced" to live in due to outside factors that affected the estuarine environment. My students will use the data to determine the water quality local organisms are living in.

Lesson Title: Water We Live In?

Grade Level: Biology 9th/10th grade

Content Area: Science (can be adapted to Middle through High School levels)

Time: Three 90 minute periods (can be adapted to time changes)

Academic Standards: Texas Essential Knowledge and Skills (TEKS) 1A, 1B,

2A, 2B, 2C, 2D, 12C, 12D, 12E

Abstract: Students will be taught how to perform water quality tests including salinity, pH, ammonia, temperature, dissolved oxygen and turbidity. These tests will be performed in three different aquatic environments (a ditch, a bayou, a bay). Data from each environment will be compared with the other two, it will be analyzed to determine quality of water in each system, and students will develop a plan of action to improve the quality of each area.

Goal: Students will learn how to perform scientific tests, determine factors affecting water quality, and develop an appreciation for the environment.

Performance Indicators: Ability to correctly perform tests, collect data, analyze data and demonstrate an appreciation and awareness for the importance of improving the environment.

Background Information, Materials & Technology: Students should have a working knowledge of scientific methods. Students will need to be taught how to safely and accurately perform water quality tests using appropriate test kits. Students will need to know how to use a computer graphing program to record and analyze their data. Graphing calculators and test probes are also an option for this activity.

Instructional Procedure:

Introduction: Place a small aquarium on each lab table with substrate, plants, and water organisms (minnows, tadpoles, etc) for students to see as they enter the room. Have them observe these “aquatic environments” and write down observations and factors necessary for the survival of all the organisms living there. Discuss observations.

Activities:

- 1.) Students are trained in water quality tests and the factors affecting these tests. (For example, ammonia readings may be high if fertilizers are used nearby. Also, photosynthesis raises pH levels.)
- 2.) Students are broken into "research teams" and are taken to three different sites around the school to perform these tests and record the results. We will use a ditch running along the back of the school, the bayou the ditch runs into, and the bay the bayou enters.
- 3.) Students use computer graphing hardware to input their data and compare and analyze it. They will also describe factors that may have affected the water quality in each area.

Closure:

Students will use their data and conclusions to develop a plan of action to address and improve the water quality in one or all of these systems. This plan of action will be presented in class and to the school's environmental club.

Assessment: Assessment will take place largely in group discussion while out in the field as well as observing the students safely and carefully performing their tests and working as a team. Their lab work will be graded, looking for accurate analysis of the factors affecting water quality and use of proper terminology and units.

Interdisciplinary Connection:

Math skills are a large part of this activity, data input and graphing could be performed in math class. Percentages, fractions, etc. could be incorporated.

Extensions:

Have students perform tests at different times of the year
Perform population counts on organisms at different sites and at

different times of the year

Have students present plan to city council or other organizations

Incorporate internet research

Acknowledgements: LaMotte test kits are used.