

WATER QUALITY DATA LESSON EXTENSION

Objective:

This lesson extension is to provide students and educators a resource to use real-time, real-world water quality monitoring data for analysis and evaluation.

Student will need to have mastered an understanding of abiotic factors that are measured to indicate water quality. Students should be encouraged to create their own usable data tables whether it is on paper or a spreadsheet.

Note: The dates in which water quality data is collected are highly variable. Students should pay close attention to the dates from which the data was obtained at the monitoring sites.

Materials:

Computers or tablet with internet capability

Water Quality Data & Webviewer Guide Handouts

Data recording materials

Procedures:

1. Locate the “Water Quality Data” webpage on the San Antonio River Authority’s website by following the link: <http://gis.sara-tx.org/website/wqmapviewer/>
2. For full education on the use of this Water Quality Data tool, read and review the Webviewer User Guide provided.
3. Once the Water Quality Data tool is understood, group students into groups of 3, and assign each group their own computer. Assign roles for each student per group.
 - a. *Navigator:* Uses mouse and keyboard to navigate the webpage.
 - b. *Data collector:* Writes down the appropriate water quality data on the group data table.
 - c. *Director:* Assists group in targeting data needs per teacher’s instructions.

4. There are several approaches the teacher may take on delineating Group Assignments. Suggestions for group assignments are:
- a. Students collect data on an abiotic factor of their choosing (i.e. pH, DO, temperature) from one monitoring station from each watershed in a chosen month and year.
 - b. Students collect data on an abiotic factor of their choosing from 10 monitoring stations traveling from North to South along the San Antonio River along the Upper and Lower San Antonio River Watersheds.
 - c. Students compare and contrast graphs of an abiotic factor from one monitoring station from one watershed over time.
 - d. Students compare and contrast graphs of temperature and dissolved oxygen data from one monitoring station from one watershed over time.

Group Water Quality Analysis

Students are to create tables and a correlating graph of the data they collected on a poster, PowerPoint or similar presentation media. Students are to write a detailed summary of their findings and conclusions with the following questions used as guidance:

- 1.) Interpret the results: does the abiotic factor data analysis indicate a water quality index that supports wildlife?
- 2.) What human activities may have contributed to these data?
- 3.) Predict and explain future human activities that would elevate or decrease the levels of the abiotic factor(s) that were investigated.

Groups may present their findings to their peers. Teachers and students may evaluate the presentations using a rubric with the following guiding elements:

Evaluation Sheet	
Graph and table contain the same information.	
Proper display of location site, month and year for the data collected.	
Graphs contain appropriate x, y, key, and title information.	
Results for each graph and table interpret why and how the results are possible.	
Conclusion and discussion are articulate, well developed, and well understood by the audience.	

Example Graphs: Dissolved Oxygen/Temperature Comparison



Graph 1- pH recorded at 4 sites in the Cibolo Creek Watershed in June 2010*

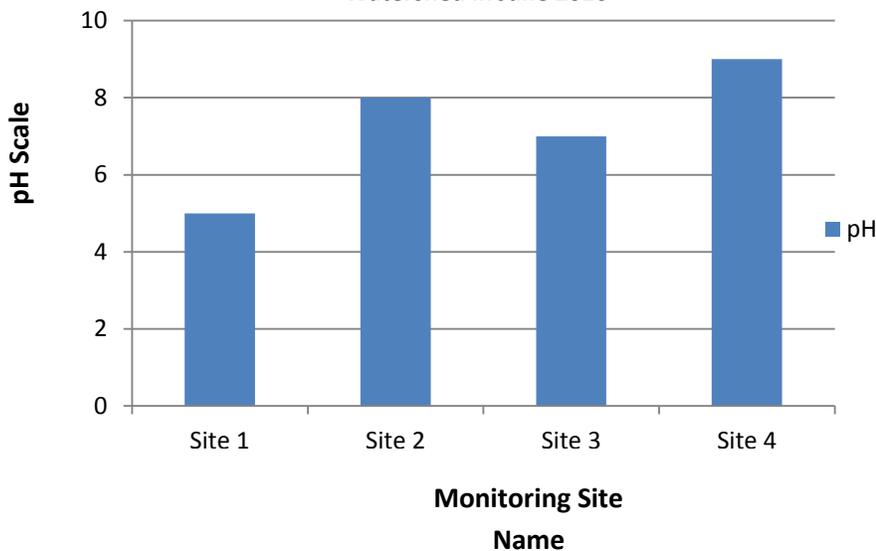


Table 1-pH recorded at 4 sites in the Cibolo Creek Watershed in June 2010 *

	pH
Site 1	5
Site 2	8
Site 3	7
Site 4	9

* Data provide is not accurate and is provided here for demonstration purposes.

Lesson Conclusion

Have students compare, contrast, evaluate, and interpret the water quality data among the different group assignments. Students will write one more interpretive discussion with the following questions as guidance:

- 1.) Is it possible to look at one test and determine the river's water quality? Explain why or why not.
- 2.) What human activities may have contributed to the data analysis results?
- 3.) How does land-use (agricultural, industrial, residential) lend explanation to the results?
- 4.) How can the degradation of our river's water quality impact human life?
- 5.) Collaborate with your classmates and offer innovative solutions that would result in the improvement of one abiotic factor level.
- 6.) How would your results change if there was an acidic rainstorm, a flood, or a drought?
- 7.) Collaborate with your group and discuss how community members and government leaders can prevent the abiotic factor levels from becoming harmful.