Water Quality Teacher's Guide

Subject: Life Science; Earth-Space Science

Topic(s): Water Quality; Watersheds; Springsheds; Abiotic factors; Global Positioning System

Summary: Students will conduct water quality tests at Cherry Lake and compare that data to data previously collected from Withlacoochee River, Madison Blue Spring, and Wood Duck Pond at North Florida Community College in order to gain a better understanding of the abiotic factors that make up these bodies of water.

Objective(s): After completing the field lab, students will be able to:

1. Conduct and interpret water quality data for six parameters
2. Describe various abiotic factors that contribute to parameter data variations between locations
3. Describe the similarities and differences between the different types of bodies of water in relation to the data collected

Ecosystem(s): Freshwater pond, spring, lake and river

Equipment:

- 1 x GPS unit
- 1 x DO test kit
- 1 x pH test kit
- 1 x armored thermometer
- 1 x turbidity/transparency tube
- Conductivity meter
- 1 x pair Hip boots
- 1 x Box Latex gloves
- Safety glasses
- 1 x site map of site locations and associated watershed boundary

Background:

- Reference Material: Ichetucknee Springs Basin Map: : http://iche.pagelight.net/m/images/BasinPoster072506.pdf; LAKEWATCH A Beginners Guide: http://lakewatch.ifas.ufl.edu/circpdffolder/101_ABCs_2004Red.pdf
- Vocabulary: watershed, springshed, water test parameter, abiotic factors
- Equipment Training: DO and pH test kits, turbidity/transparency tube, GPS unit

Procedure (Engage; Explore; Explain)

1. Engage: Ask the students where this water comes from and where it goes?
2. Use the site map to indicate differences in the elevation and geographical location of each site.
3. Ask the students to formulate a hypothesis about how water quality changes depending on abiotic factors?
4. Utilize the equipment provided, and follow the kit instructions to examine the selected water quality test factors or parameters. Gather latitude and longitude data at the water quality test site using the GPS unit. Record results in the student data sheet.
5. Complete the student discussion/assessment questions.

Sunshine State Standards:

Science: SC.7.N.1.1; SC.7.E.6.6; **Language Arts**: LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1; **Mathematics**: MA.A.3.3.3; MA.E.3.3.1; **Social Studies**: SS.B.2.3.9; **Climate Literacy**: 1-c, f; **Ocean Literacy**:5-f

Water Quality Student Data Sheet

General Information

Full Name:		Date:	
School :		Time:	
Latitude:		Longitude:	

Student Hypothesis and Rationale

A. I hypothesize that the dissolved oxygen level at Cherry Lake will be (choose one: higher/lower) compared to Madison Blue Spring because . . ._____
_____.

B. I hypothesize that the pH level at Cherry Lake will be (choose one: higher/lower) compared to Withlacoochee River because . . ._____
_____.

C. I hypothesize that the conductivity level at Cherry Lake will be (choose one: higher/lower) compared to Wood Duck Pond because . . ._____
_____.

D. I hypothesize that the turbidity/transparency level at Cherry Lake will be lower than (choose one: Withlacoochee River, Wood Duck Pond, or Madison Blue Spring) because . . ._____
_____.

Field Observations/Measurements/Data

Water Quality Parameter or Test Factor	Cherry Lake	Withlacoochee River	Madison Blue Spring	Wood Duck Pond
Air Temperature				
Water Temperature				
pH				
Dissolved Oxygen				
Conductivity				
Turbidity/Transparency				

Water Quality Assessment

1. Which of the four locations had the lowest level of Dissolved Oxygen and what does this mean?

2. Why might the dissolved oxygen levels be different between the four locations? Consider the differences between surface and ground water, as well as water depth and temperature.

3. Why might the pH levels differ between the four locations? Why might the levels be similar for some of the locations?

4. How much different was the transparency of the water between the four sites, and what may have caused this difference?

5. Does your data support your hypotheses? Whether your hypotheses are supported or not, what can you infer from your observations and results?

6. How might water quality be different if the water was just emerging from a spring after travelling underground for a long time?

7. Think about the lab activity you just completed. Write a question (starting with what, how, or why) that address something that you'd like to learn more about.

Water Quality Portfolio Journal Prompt

Abiotic factors, such as where bodies of water are located, how and where they flow, and weather (such as temperature, precipitation and wind) can influence water quality. Humans and other organisms can also impact water quality. Consider that recently there was a large thunderstorm that resulted in a lot of flooding in the area. Imagine that Cherry Lake overflowed. Since it is part of the Withlacoochee River watershed, the flood waters would flow into the river. How might water quality be affected for surface and ground water systems during flooding? How were you, your friends, and family affected by the flooding?

Water Quality Reference Chart

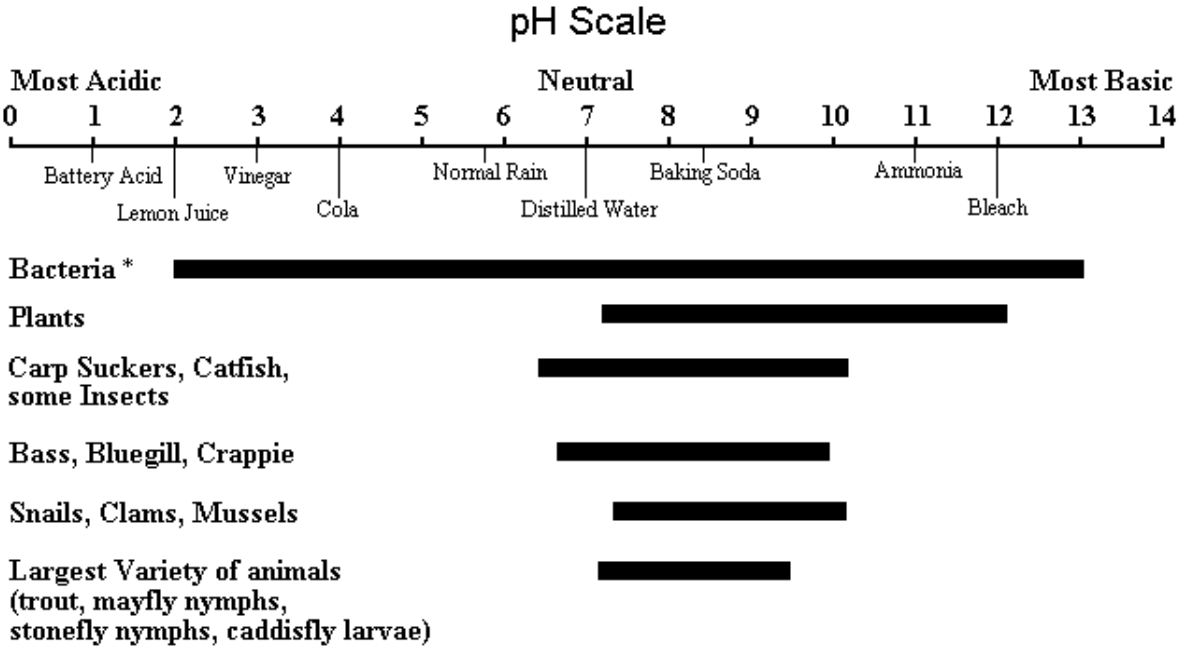
Temperature: preferred temperature range for aquatic organisms

Bacteria	Live in all temperatures!
Algae and other green water plants	55- 100 degrees F 13-38 degrees C
Most aquatic animals	55-100 degrees F 13 – 38 degrees C
* Best range for a healthy aquatic ecosystem	55-80 degrees F 13 – 26 degrees C

pH: preferred pH ranges of aquatic organisms

Bacteria	1.0 – 13.0
Algae and other green plants	6.5 – 13.0
Lower animal forms like snails	7.0 – 9.0
Most aquatic animals * Best range for a healthy ecosystem.	* 6.5 – 7.5

Acids have a low pH, Bases have a high pH



*Line indicates the pH level at which the selected organism(s) can survive.