

## Water Quality Monitoring (Dissolved Oxygen)

## Teacher's Guide

**Subject:** Integrated Science (Life; Earth-Space; Physical)

**Topic:** Record keeping and sampling of abiotic factors within an ecosystem.

**Summary:** Students will use The Winkler test to explore the Dissolved Oxygen of water quality to gain a better understanding of the dynamics of the abiotic factors influencing freshwater systems and the inhabitants that reside in this ecosystem.

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

1. Use water quality equipment properly and record data using proper units of measurement
2. Explain the relationship Dissolved Oxygen has in the ecosystem.

**Ecosystem(s):** Lakes/Rivers/Springs

### Equipment:

- Armored thermometer
- GPS unit
- 2 D.O. test kit
- 2 Safety Glasses
- 2 sets gloves
- Data sheets
- Clipboards
- 2 LaMotte samplers

### Background:

- Vocabulary: Dissolved Oxygen, titration, mg/l
- Reference Material: Healthy Water Healthy People ;  
<http://bcn.boulder.co.us/basin/data/BACT/info/DO.html>  
<http://fcit.usf.edu/florida/lessons/tallahassee/tallahassee.htm>
- Equipment Training: D.O. Test kit, GPS units

### Procedure (Engage; Explore; Explain; Elaborate; Evaluate)

1. Engage the students by asking a specific question that gets to the heart of the activity. Do fish breathe? Discuss as a whole group and come to the conclusion that there must be oxygen in the water.
2. Use the students' answers to ascertain what they already know, clarify any misconceptions, and then ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab.
3. Explore the concentration of D.O by following the procedure of Winkler test.
4. After completing the lab, Elaborate on the concepts by having the students answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

### Sunshine State Standards:

**Science:** SC.7.N.1.1; SC.7.L.17.3; SC.7.E.6.6

**Language Arts:** LA.7.4.2.1,2; LA.7.1.6.1

**Mathematics:** MA.7.S.6.1; MA.7.P.7.1

**Social Studies:** SS.B.2.3.9; SS.B.1.3.1

## Water Quality Monitoring (Dissolved Oxygen)

## Student Data Sheet

### General Information

Full Name:		Science Teacher:	
------------	--	------------------	--

### Student Hypothesis and Rationale

If Photosynthesis in plants and surface aeration increase dissolved oxygen, then there will be higher levels of dissolved oxygen at A) the spring head B) further down the river Why?\_\_\_\_\_

---

### Field Observations/Measurements/Data

	Group name:	Group name:	Group name:
Location:			
Longitude:			
Latitude:			
Date:			
Time:			
Water Temperature:			
Dissolved Oxygen:			

## Water Quality Monitoring (Dissolved Oxygen)

## Assessment

1. What was your dissolved oxygen reading for this location?

---

---

---

---

2. Look at the Dissolved Oxygen chart for a healthy water body reading. Would you rate this water excellent, good or poor?

---

---

---

---

3. Was your hypothesis supported by your data? Explain your results and what you can infer from your observations, measurements, and results?

---

---

---

---

4. What are some ways dissolved oxygen gets into the water at Wakulla Springs?

---

---

---

---

5. Twice a year the staff and volunteers at Wakulla Springs kill the Hydrilla. What might happen to the dissolved oxygen in the water?

---

---

---

---

6. Think about the observations you have just made. Did the activity raise new questions? Write a short question (start with “What, Why, Where, When, or How”) about something you want to learn more about.

---

---

---

---



**Water Quality Monitoring (Dissolved Oxygen)****Reference Chart**

More than 10 mg/L	Excellent
4 – 10 mg/L	Good
Less than 4 mg/L	Poor

**Dissolved Oxygen** Dissolved Oxygen's presence in water is a positive sign, but low levels are a sign of severe pollution. Water with consistently high levels of dissolved oxygen are considered healthy and capable of supporting many different kinds of aquatic organisms. In order for a water body to sustain warm water fish like bluegill, bass, and pike, the dissolved oxygen level must be at least 4 milligrams per liter (mg/L). Dissolved Oxygen in water generally comes from one of two sources. Most Dissolved Oxygen comes from the atmosphere as waves and tumbling water mix atmospheric oxygen. Another source of Dissolved Oxygen comes from plants as they go through photosynthesis.