

Water Quality & River Flow

Teacher's Guide

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

Topic: River System, Velocity, Water Quality, Nitrates

Summary: Students will use various types of water monitoring equipment to explore selected parameters of water quality (dissolved oxygen, temperature, conductivity, pH, transparency, and nitrate levels) and quantity (primarily velocity) to gain a better understanding of the dynamics of water flowing in the Suwannee River.

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

1. Operate selected water quality field equipment
2. Collect and interpret water quality data

Ecosystem(s): Springs, Rivers

Equipment

- Water test kit (Nitrate)
- Secchi Disc
- Flow Meter (current)
- GPS
- Data sheet & clipboard
- pH Test Kit
- ExTech pH pen
- DO Test Kit
- Turbidity Tube

Background:

- Vocabulary: Current speed/velocity and Discharge (volume)
- Reference Material: Dissolved Oxygen Meter Background (Pre-field Classroom Activity), Project WET *Back to the Future* (pg. 293), USGS How Stream Flow is Measured (part 1 & 2): <http://ga.water.usgs.gov/edu/measureflow.html>
- Equipment Training: Water Test Kits, Secchi Disc/Turbidity Tube, Flow Meter, GPS

Field Lab Procedure

1. Ask students to imagine what happens when the flow from a single spring joins the flow of a river that is fed by many other springs. Make sure they describe what happens to the speed of the water as well as the quality of the water.
2. Students will rotate through data-recording stations either on the dock, the bank of the spring, or the bank of the river. Parameters being measured include pH, nitrates, DO, temperature, conductivity, transparency, and water flow.
3. At the dock, the instructor will demonstrate the use of each piece of equipment while the students record the readings on their data sheets. The group then moves on to the other two sites, repeating the data-collection process at these sites.
4. Discuss the results with special emphasis on the differences in the velocity of water, the dissolved oxygen content, and the nitrate levels. How might these influence the other parameters?

Sunshine State Standards

Science: SC.A.1.3.1, 3; SC.C.1.3.1; SC.D.1.3.1,3,5; SC.D.2.3.2; SC.G.1.3.4; SC.G.2.3.2,3,4; SC.H.1.3.2,4,6,7; SC.H.2.3.1; SC.H.2.3.7

Language Arts: LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1

Mathematics: MA.A.4.3.1; MA.B.2.3.1; MA.B.4.3.1; MA.E.2.3.1

Social Studies: SS.A.6.3.2; SS.B.2.3.9

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Assessment

1. At which location was the dissolved oxygen lowest? Highest? What factors are affecting dissolved oxygen levels at this site?

2. Which parameter changed the most from site to site? What was the difference? Why do you think this is?

3. At which location was velocity (current) highest (that is, which location had the highest flow meter count)? Why? Convert velocity (current) to meters per second.

4. Does your data support your hypothesis? Whether your hypothesis supported your data or not, what can you infer from your observations and results?

5. The parameters measured in this lab can be influenced by human activities. Choose one of the parameters just measured and explain what activities may change our observations today and why.

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.
