

From the Mountains to the Estuary: From the Schoolyard to the Bay

**Meaningful Watershed Experiences
for Grade 6 Students**

Created by:



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In partnership with:



**Occoquan Bay National Wildlife Refuge
Manassas Battlefield National Park**



Collecting and Submitting Schoolyard Water Quality Data "The State of Our Schoolyard"

Overview

In order to store and share water quality data students collect in the field, this lesson will assist teachers and students in obtaining and completing a data entry form*, providing that data to the school2bay Web site, and accessing a data sheet of results from prior collections for comparison and graphing trends. (* The form can either be completed entirely on-line or else downloaded, completed, then re-uploaded to the site - <http://school2bay.pbworks.com/datasheet-template>.)

Materials Needed

- Vernier Labquest with
- Temperature probe
- Dissolved oxygen probe
- Turbidity probe
- pH probe
- Or Water quality test kits
- Internet-accessible computer with web browser
- Printer, for off-line completion of data entry forms in the field

Setting the Stage

How do we know whether our streams and rivers and bays and ocean are really healthy? Or, if not, how they are unhealthy? One thing we can do is to observe with our eyes and ears, and sometimes fingers. For other ways to measure the health of these waters, we use instruments like a thermometer to measure and provide us numbers called "data" that tell us just how good, or bad, things are. Here are some examples of things we can learn -- and questions we can answer -- with water quality data:

- Temperature - Is the water too hot or too cold for some aquatic creatures?
- Turbidity - How murky (like coffee or cola) is their water?
- Oxygen in the Water [Dissolved Oxygen] - Is there enough invisible oxygen for aquatic animals to breathe? Or will they suffocate [like we do] underwater?
- pH - is the water too acidic (like vinegar) or too basic/alkaline (like egg white) for aquatic animals and plants to live comfortably?

After we record our data, if we type it into a computer, then we can keep it and compare today's measurements with measurements from before or later. That way we can tell if things are getting better or worse. Also, if we then put our data on the internet, then other our class and other classes can get a copy of the data and compare or results and see how things are different in different places near and far from here. This gives us a better picture of what's happening all over -- in one small stream or across the watershed of an entire river!

Acquisition of Learning

1. Hand out copy of the blank data entry form. (from booklet or in your Internet browser, navigate to <http://school2bay.pbworks.com/datasheet-template>
 1. To Download or Print
 - Select “Printable version” in bottom right corner
 - To Print, select File, then Print
 - To download, select File, then Save Page As, then choose Web Page, HTML Only. Be sure to select an appropriate location to save it and name your file
 2. Put students into cooperative groups. Explain that each group is going to collect data from their schoolyard and record it on their data sheet.
 3. Take the students into schoolyard where they can sample water. If there isn't a place that has easy access to the water, samples can be collected ahead of time from a water supply that is close to the schoolyard.
 4. Have the students complete the first part of the data sheet including date, time, weather.
 5. Once they have recorded that information. Have them take out the temperature probe and take the air temperature.
 6. Now have the students place the probe into the water to take the water temperature. Record that data on the data sheet.
 7. Repeat the procedure with the pH probe, dissolved oxygen probe, and turbidity tube.
 8. Be sure the students are recoding their information on the data sheet.
 9. Back in the classroom download a copy of the blank form and the aggregated data sheet - <http://school2bay.pbworks.com/datasheet-template>
 10. Fill it out with sample data and save a copy.
 11. Using the same page above, choose “Edit” and upload (transcribe) your data into the table.

Note: Have teacher keep paper copy, in case any questions about what was written. **Scientists always keep a back up to avoid data loss.**

Closure

Have the students make a class graph from the data they collected. Have them analyze the data and results. What did the results show about the water quality? Are there any outliers? What is the median for each parameter? Compare their class data to other classes' data.

It is important to understand how to enter and save data into the collaborative form. By completing the tasks above, students will gain experience in collecting, transcribing, uploading, and downloading data for analysis. Local, state and federal government agencies (e.g. EPA) rely on water quality data that is collected, analyzed and uploaded to make decisions on environmental issues.



Student Data Sheet for Watershed Investigations



Your Name: _____

Date: _____

School / Class: _____

Time: _____ (e.g., 11:35 am)

Location: _____

Air Temperature (°C): _____

Weather Conditions (circle one): (sunny, partly cloudy, overcast, raining)

Date of last rain (if you know it): _____ How much precipitation fell? _____

Press your hands into the surrounding ground to detect **Soil Moisture** level (circle one):
(soggy, slightly moist, dry & crumbly, dry & hard, so dry the soil has cracked)

Color: Circle the color that describes most of the ground in a 20m radius from where your group is standing (brown, tan, yellow, light green, dark green)

Grass Texture: Bend a few grass blades to determine: (crispy, dry, soft, cool, flexible)

Observations of your Environment: Look around you and under your feet. Describe what sorts of different plants, animals and other living organism that you see. Close your eyes for 30 seconds and record what types of nature sounds you hear.

Evidence of Erosion: Examine all areas not covered with a buildings, sidewalks or asphalt. Circle what percent of vegetated areas look eroded.

Excellent	Good	Fair	Poor
0 - 10 %	11 - 40 %	41 - 80 %	81 - 100 %

Water Quality

Water Appearance: Color _____

Clarity (circle one): clear, cloudy, muddy

Water Odor: Smells like: _____

Intensity (circle one): faint, distinct, strong

Water Temperature (°C): _____

Enter your water quality data below. Circle the range where your value falls for each parameter.

	Your Data	Excellent	Good	Fair	Poor
Dissolved oxygen ppm (mg/L)		7-11	5-6	3-4	0-2
pH		7	6 or 8		4, 5, 9, 10, 11
Turbidity (NTU)		0	0 to 40	40 to 100	100