



## II – Water Sampling to Understand the Estuary

### Benchmarks

- LS-M-C3 Investigate major ecosystems, recognize physical properties and organisms in each  
SI-M-A4 Developing descriptions, explanations and graphs from data  
SI-M-B4 Using data and logical arguments to propose, modify or elaborate on principles and models

### Objectives

- The teacher can use these activities to help students understand typical estuarine variations in water quality.
- TSWBAT:
  - Locate school and LUMCON on a map, and predict water quality in the context of the estuary.
  - Describe some typical causes of variation in temperature, salinity and dissolved oxygen.
  - Download, graph and manipulate their own data and data collected by others from the web repository.

### Vocabulary

Ecosystem	Estuary
Gradient	Tide
LUMCON	Variation
Variable	

### Activities

1 Assign students to check out the read “LUMCON and the Estuarine Environment” in *What is the BC?* on the Bayouside Classroom website and answer the questions below.

<http://www.lumcon.edu/>  
[www.lumcon.edu/BayousideClassroom](http://www.lumcon.edu/BayousideClassroom)

- 1) What does LUMCON stand for? What is LUMCON?
- 2) What is an estuary? Which estuary do LUMCON and Terrebonne Parish Public Schools share?
- 3) What must estuarine organisms be able to do to live in an estuary?
- 4) What factors cause changes in water quality in the estuary?
- 5) How does water quality change in an estuary?

2 Using the website map, locate the Gulf of Mexico, Terrebonne Parish, LUMCON and your school (all are not labeled on the map). Where is the estuary? How do you expect water quality to differ from your school to LUMCON?

- 1) Make a third column on your table from the previous activity and label it “LUMCON, 9/12/02.” Complete the table using surface water data from the back bayou site at LUMCON on 9/12/02.



- 2) Which measurements change from your site to LUMCON? Why do you suppose some changed and some did not?

3 Download data from the website for the LUMCON sites sampled over the past year, to complete the following graphing exercises and answer questions. Remind students that the independent variable is graphed on the horizontal x-axis, and the dependent variable is graphed on the vertical y-axis.\*

- 1) Download **temperature** data of surface water in the LUMCON Bayou for the 365-day period prior to your visit. Graph salinity (the dependent variable) against date (the independent variable). Do you notice any patterns? Describe any variation that occurs through time. Think about the factors that cause temperature changes and describe what might cause the variations you observe.
- 2) Download the black and white version of the web map. Download **salinity** of surface water at all stations on 9/12/2002. Using the website map, locate each Terrebonne Parish School and enter the salinity data of 9/12/02 close to the sampling site at each water body. How does salinity change around the estuary? Think about how this relates to what you understand about estuaries. Where is the estuarine salinity gradient?
- 3) Download **dissolved oxygen** data of both surface and bottom water for the LUMCON Front Pond from 11/16-12/06/2001 (4 dates). Calculate and record the average value of DO for the surface water and the bottom water during this interval. Download all dissolved oxygen data of both surface and bottom water for the LUMCON Front Pond during June of 2002 (4 dates). Calculate and record the average value of DO for the surface water and the bottom water during this interval. Construct a table with column labels *Winter* and *Summer*, and Row labels *Surface Water* and *Bottom Water*. Fill in the table using the averages you calculated. Do you notice any patterns? Describe any variation that may be related to season. Describe any variation you observe that may be related to sampling depth. Think about how oxygen becomes dissolved in the water and describe what might cause these variations.
- 4) List the factors that contribute to variation in each parameter.

\*Note: If your students are graphing by hand (and we encourage this until they understand fundamentals of graphing), 52 weeks of data is a lot of points. These exercises can be assigned to a team working together, as long as all members understand all of the steps taken to get to each point. Alternatively, you can get students to average the 3-5 data points for each calendar month and plot those twelve average points.