

## Estuarine Water Quality: Salinity

## Teacher's Guide

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

**Topic(s):** Abiotic factors; limiting factors; salinity; density

**Summary:** Students will use refractometers to measure salinity at three locations (surface and depth). Students will share and analyze their results to try and develop a picture of salinity in Rocky Bayou. With this information students will draw inferences about what types of plants and animals can live in these locations.

After completing the field lab, students will be able to:

- Objective(s):**
1. Describe the interaction of freshwater from rivers and seawater from the Gulf as it meets in the estuarine environment
  2. Use water quality equipment (refractometer) properly and record data using proper units of measurement
  3. Understand that saltwater is denser than freshwater

**Ecosystem(s):** Estuary

### Equipment:

- 3 GPS units
- 6 x Refractometers
- 3 x Niskin water samplers
- 6 x Eye Droppers
- 6 x Thermometers
- Data Sheet & Clipboards

### Background:

- Vocabulary: Parameter, Salinity, Estuary, limiting factor; abiotic factor; density
- Reference Material: Estuary Salinity: [http://oceanservice.noaa.gov/education/kits/estuaries/media/supp\\_estuar05a\\_wedge.html](http://oceanservice.noaa.gov/education/kits/estuaries/media/supp_estuar05a_wedge.html)
- Equipment Training: Students may be given an overview of the refractometer before going to the field.

### Procedure (Engage; Explain; Explore)

1. What happens when you mix water and oil? How does this relationship apply to an estuary? Use the students' answers to ascertain what they already know, clarify any misconceptions. Introduce the main factors that influence salinity: density (salt water is more dense than fresh) and the relative amounts of freshwater (rivers, streams, runoff) and saltwater (ocean/bay) inputs. Use a white board with both a top view and cross section of the bay to distinguish different locations where salinity might be measured.
2. Ask the students to formulate their own hypothesis about where they will find the most saline water in the bay (based on the three locations that they will examine).
3. Students will be split into three teams. Each team will consist of 4 students and two adults. Each team will have two canoes with two students and one adult in each canoe.
4. Each team will go to one of three designated locations in the bayou to make salinity measurements and temperature. One half of the team will measure salinity and temperature at the surface of the water. The other half of the team will measure salinity near the bottom.
5. Repeat steps 3 and 4 if necessary with a second group of students.
6. After collecting data, each team will return and share their data with the other two teams. This information will be drawn on the whiteboard and used for the discussion questions.
7. Complete student discussion questions.

### Sunshine State Standards:

**Science:** SC.D.1.3.3, SC.F.1.3.1.7.1, SC.G.1.3.4.7.2, SC.G.2.3.2.7.1, SC.G.2.3.2.7.3, SC.G.2.3.4.7.1; **Math:** MA.A.1.3.1, MA.A.1.3.2, MA.A.4.3.1, MA.B.3.3.1, MA.B.4.3.1, MA.B.4.3.2, MA.D.1.3.1, MA.D.1.3.2, MA.E.1.3.1, MA.E.3.3.1; **Geography/Social Studies:** SS.B.2.3.6 NATIONAL GEOGRAPHY STANDARDS: #4, #8; **Language Arts:** LA.C.1.3.1.7.1, LA.C.1.3.4.7.1, LA.C.1.3.4.7.4, LA.B.1.3.2.7.1, LA.B.1.3.2.7.3

# Estuarine Water Quality: Salinity

# Student Data Sheet

## General Information

Full Name:		Date:	
School:		Teacher:	

## Student Hypothesis and Rationale (choose one)

- A. If salt water is more dense than fresh water, then I believe that I will find saltier water at the surface of Rocky Bayou because \_\_\_\_\_
- B. If salt water is more dense than fresh water, then I believe that I will find saltier water at the bottom of Rocky Bayou because \_\_\_\_\_

## Field Observations/Measurements/Data

	Team 1: Deep	Team 2: Middle	Team 3: Shallow
Latitude			
Longitude			
Depth			
Temperature (surface)			
Temperature (depth)			
Salinity (surface)			
Salinity (depth)			

## Estuarine Water Quality: Salinity

## Student Assessment

1. Look at the “salinity at surface” readings for your group’s location(s) and for the other group’s location(s). What might be the reason for different salinity levels within the estuary?

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2. Which area had the highest “salinity at surface” reading? Which had the lowest? What was the difference between the two?

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3. Was your hypothesis supported by your data? Whether your hypothesis is supported or not, what can you infer from your observations, measurements, and results?

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4. Are the “salinity at surface” readings different than the “salinity at depth readings”? How so? Why do you think there might be a difference?

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5. How would a dam in a river that used to flow to the bayou affect salinity? How would an earthen bridge across the bayou affect salinity?

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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.

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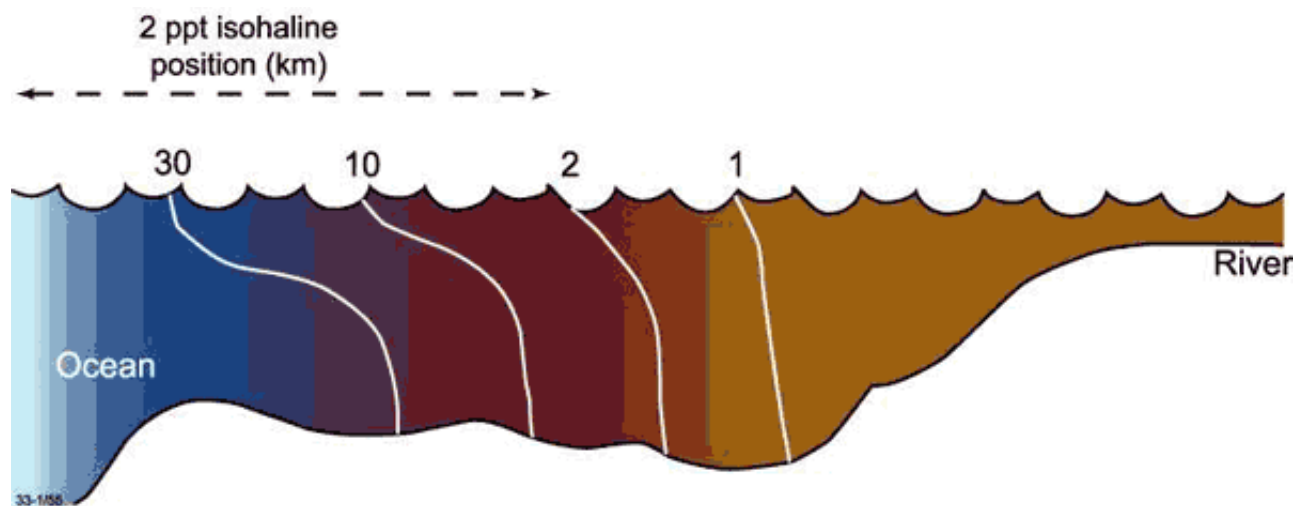
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# Estuarine Water Quality: Salinity

# Lab Reference Sheet

## Salinity Scale



## Site Map

