The Pine School - Hobe Sound Nature Center

A DAY IN THE LIFE OF THE INDIAN RIVER LAGOON

S.E.A. a difference
Environmental Services
Stewardship * Education * Action

GROUP 1: CURRENT DIRECTION AND SPEED

What is a Current?

A current is the internal movement of water, sometimes described as a push or pull in the river or bay. Scientists will often measure the direction the current is flowing and calculate current speed.

Objective: 1) Determine the direction of the water current
2) Calculate water current speed

Materials:
* Pencil
* Calculator
* Metric Tape Measure
* Several floatable objects [Ex. oranges, sticks (~ the length of forearm)]
* Clipboards
* Timing device [Ex. stopwatch, watch, etc.]
* Compass

***Note:** You are using a stick or an orange instead of a float or water bottle because they are biodegradable. Please recover the object you use, if possible.*

Procedure: Carefully read all directions before beginning the procedure!

Current Direction:

1. Toss the orange or stick into the middle of the river or bay to allow the water current to move the object

2. As a group, observe which direction the object moves. This is also the water current direction!

3. Using the compass, determine the current direction (east, west, etc.).

   A. What type of object did you use to measure current direction? Orange

   B. Water current direction Southeast

Current Speed: (Current speed = distance traveled / time)

1. Student #1 stands at the water's edge at the starting point with a floatable object in hand. Student #1 tosses the object in the water.

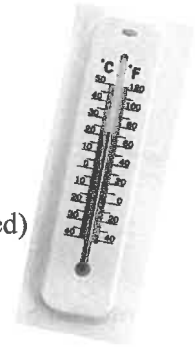
2. After floating/ moving for 60 seconds, Student #2 will quickly line up with the floating object's position on the shoreline and call stop. This is the stopping point.

GROUP 1: AIR TEMPERATURE, CLOUD COVER, AND WIND

What is a Weather?

Weather includes current conditions and recent conditions at a particular place and time that may have an impact on the water quality of the lagoon.

Objective: 1) Record air temperature in BOTH Fahrenheit and Celsius
2) Estimate cloud cover
3) Determine wind direction and speed



Materials:
* Pencil
* Thermometer
* Beaufort Scale (See Diagram)
* Calculator (optional)
* Clipboards
* Anemometer (measures wind speed)
* Compass (optional)

Procedure: Carefully read all directions before beginning the procedure!

Air Temperature:

1. Record air temperature in BOTH Fahrenheit and Celsius once every hour, if possible (see chart below)
   ***Note:** Place your thermometer in a shady location, if possible*

Time	Air Temperature (° Fahrenheit)	Air Temperature (° Celsius)
10:00 am	80 °F	27 °C
10:20 am	80 °F	27 °C
	°F	°C

*If your thermometer is not able to read both Fahrenheit and Celsius, then you will need to use the conversion chart to assist you.

To calculate Celsius from Fahrenheit: ° C = (___° F - 32) x 0.556

To calculate Fahrenheit from Celsius: ° F = (1.8 x ___° C) + 32

Beaufort Scale

Devised by British Rear - Admiral Sir Francis Beaufort in 1805 based on observations of the effects of wind on ocean water

Beaufort Scale	**Wind Speed** knots / mph	**Wave Height** feet	**Description**	**Effects Observed**
0	< 1 / < 1	-	calm	calm, water is like a mirror
1	1-3 / 1-3	0.25	light air	wind shown by smoke drift but not by wind vane; no foamy crests
2	4-6 / 4-7	0.5-1.0	light breeze	wind felt on face; leaves rustle; small wavelets
3	7-10 / 8-12	2-3	gentle breeze	leaves and twigs in constant motion; wind extends light flag; scattered whitecaps
4	11-16 / 13-18	3.5-5.0	moderate breeze	raises loose paper; small branches are moved; numerous whitecaps
5	17-21 / 19-24	6-8	fresh breeze	small trees begin to sway; many whitecaps, some spray
6	22-27 / 25-31	9.5-13	strong breeze	large branches in motion; large waves forming; whitecaps everywhere
7	28-33 / 32- 38	13.5-19	near gale	Whole trees in motion; white foam from breaking waves

GROUP 2: MAP OF THE SITE

Sketch a Site Map:

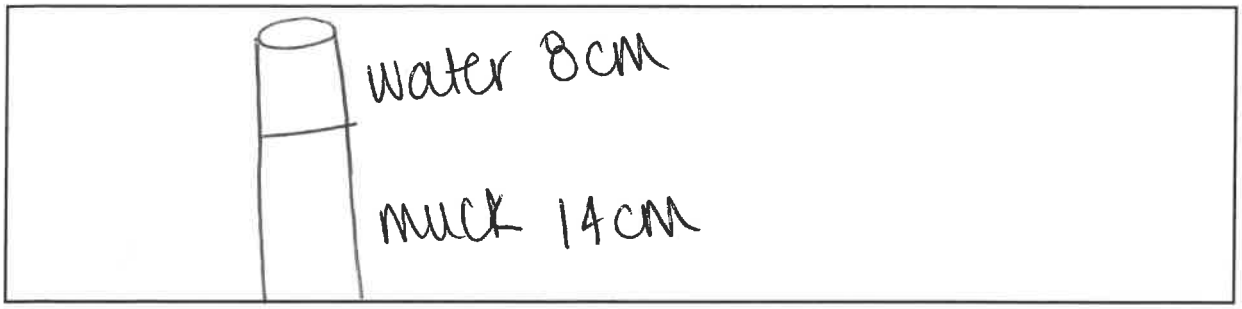
Locate your sampling site. Sketch a detailed map of your location. Include features found within 100 feet on either side of you. Be sure to include any physical characteristics that may help others identify your sampling site and label them accordingly.

1. Carefully, withdraw the sediment corer from the water. Keep the core upright as you move it to collection tray or bin for observation. Position one hand on the bottom of the corer and the other on the top (see photo above) to keep the sample steady.

2. If possible, slide the sediment core out of the tube onto the tray or bin.

A. Sketch a detailed picture of the sediment sample

***Remember:** Be sure to include the different layers, plants, animals, and other items you see*



B. Total <u>length</u> of your sediment core 21 cm

C. Length of oxidized layer (if present) 14 cm

D. Length of anoxic layer (if present) 7 cm

* ***Interesting Fact:** The anoxic layer may have a sulfur-like or 'rotten egg' smell. This is from bacteria that thrive in anoxic zones and produce hydrogen sulfide (H_2S) as a respiratory waste product.*

F. Observe and dissect the sediment core. Fill out the chart below based on your findings.

	Absent	Rare	Common	Abundant	Additional Comments
Clay (feels thick & dense)	✓				
Mud (smooth between fingers)			✓		
Sand (gritty; fine sand paper)			✓		
Gravel (pea-sized sediment)	✓				
Pebbles (larger than pea-sized)	✓				
Bivalve Shells (Ex. clam, oyster)				✓	
Snail Shells (single shell)	✓				
Macroinverts (Ex. worm, crab)	✓				
Muck (black in color; thick ooze)				✓	
Plant Material (Ex. leaves; grass)	✓				

3. While the seine is being pulled;

Remember: *Be sure to* ask *for assistance if you are unsure how to use a seine properly*

A. Record the distance the seine is pulled _____(units)

B. Fill buckets with water

4. Haul seine to the shoreline.

A. First, collect all fish and gently place into buckets

B. Second, collect all macro-invertebrates and gently place into buckets

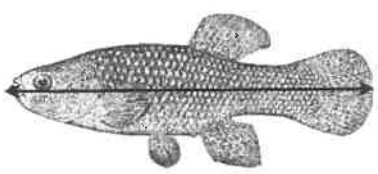
Remember: *Work quickly to get all living organisms into buckets or bins of water*

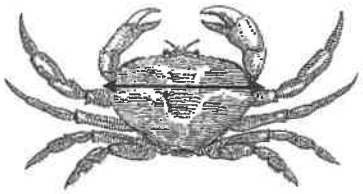
5. Use the reference guides to help identify each organism to the best of your abilities. Fill out the data chart. Have your Documentation Team take pictures of each species that you observe, especially those that you are unsure about!

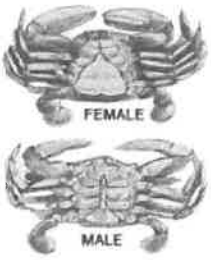
Remember: *If you have trouble identifying organisms to the species level, list them in the most specific level of classification possible. Many killifish species also look similar to one another. If you are unsure, group them together as 'killifish'.*

6. Record the total number of each species counted during each seine pull in the data chart

7. Measure the largest individual of each species. For most species it will not be possible to determine gender, but for those that you can (ex. crabs) it is useful to know the ratios of the sexes of the samples.







Collection Method #2

*Record length of collection net and mesh size of the equipment used

Seine net **{preferred testing method}** _____

Optional Methods: Dip net _____Crab Trap_____Cast Net_____Other_____

Length of Pull _____

Do not include in total!

	Species	Total # of individuals	Size of largest individual	Units (mm, cm)
Ex.	*Atlantic Silverside*	*16*	*10*	*cm*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
	Total fish in collection #2			

Comments: _____

Collection Method #_____*(make extra copies of this page if you expect to perform more than 3 pulls)*

*Record length of collection net and mesh size of the equipment used

Seine net **{preferred testing method}** _____

Optional Methods: Dip net _____Crab Trap_____Cast Net_____Other_____

Length of Pull _____

	Species	Total # of individuals	Size of largest individual	Units (mm, cm)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
	Total fish in collection #__			

Comments: _____

☆ Aquatic Biological Survey Summary ☆

Total # of collections conducted _____ **Total # of individuals counted**_____

GROUP 4: WATER TEMPERATURE, DISSOLVED OXYGEN, & PH

Water temperature, dissolved oxygen, and pH are important factors to study when learning about a specific study site. Organisms are adapted to survive in specific range of temperatures, pH, and dissolved oxygen (DO) before they become stressed.

Objective: 1) Record water temperature in BOTH Fahrenheit and Celsius
2) Measure dissolved oxygen
3) Measure pH

Materials: * Pencil * Clipboards
* Water thermometer * LaMotte Water Quality Kit (DO & pH) **{required method}**
* pH reference guide (optional)

Procedure: Carefully read all directions before beginning the procedure!

1. **Water Temperature:**

Record in *situ* water temperature in BOTH Fahrenheit and Celsius every 15 or 30 minutes and then average the results (see chart below)

Note: It may help to have the thermometer securely tied to a string or lanyard for ease of use.

	Location	Time	Temperature °C	Temperature °F
Trial 1		10:36	31.02	87.8
Trial 2				
Trial 3				
Average	X	X		

*If your thermometer is not able to read both Fahrenheit and Celsius, then you will need to use the conversion chart to assist you.

To calculate Celsius from Fahrenheit: ° C = (____° F - 32) x 0.556

To calculate Fahrenheit from Celsius: ° F = (1.8 x ____° C) + 32

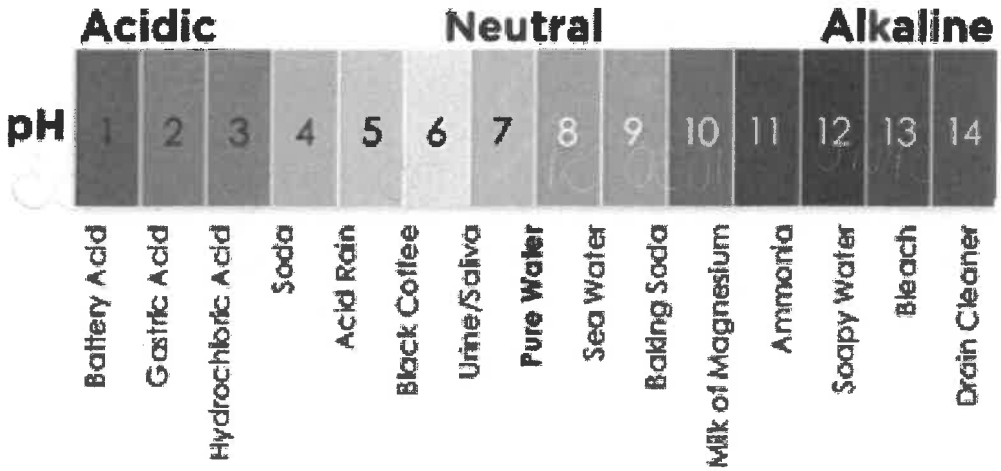
3. **Water pH:**
Most aquatic organisms are adapted to survive in a pH range between 6.8 - 8.0.

A. *Circle* the pH measuring method(s)

Litmus paper pH meter LaMotte Water Quality Kit {**required**}
Indicator solution Other_____

B. Test water pH <u>three times at three different locations</u> within your site and average the results. Record results below.

	Location	**Time**	**Reading 1**	**Reading 2**	**Reading 3**	**Average**
LaMotte Water Quality Kit (required)	Shore	10:05	7.4	6.5		6.95
Other Test Method (optional)						



2. **Turbidity:**

Turbidity is a measure of water clarity, which is an important feature of an estuary. Different techniques for determining turbidity use different units of measurement.

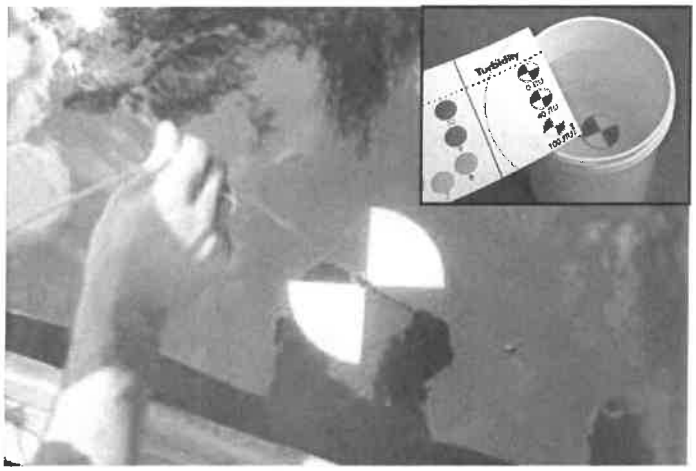
A. *Circle* the measuring method(s) used for turbidity

Secchi disc Short sight tube/ LaMotte Water Quality Kit

Long sight tube Turbidimeter Other_____

B. Record turbidity <u>three times at three different locations</u> within your site and then average the results. Record results below. Be sure to enter data on the correct line for the technique you use.

Technique	Location	Time	Reading 1	Reading 2	Reading 3	Average	Units
Secchi Disc		10:00 11:00	3.4	3.8	3	3.4	(Feet) or cm
Short Sight Tube							JTUs
Long Sight Tube							cm/meter
Turbidimeter							NTUs



B. In your field journal, keep track of the photos you have taken. It may not be necessary to write down each and every shot, but record them in blocks so that when reviewing the images, you have an idea of who or what is in each photo.

> ***For example:*** *1-22 group preparing at site*
> *23-44 weather data sampling*
> *45-47 cool pelican swimming*
> *48-61 Mark and Rolanda pulling the net*
> *62-64 Sara holding mystery fish*
> *Etc.*

Important Suggestions:

- Take action photos of sampling techniques
- Take close-up photos of fish and invertebrates captured to aid in identification
- When taking photos of small creatures, use a coin or ruler in the shot as a size reference
- Take group photos of each team performing tasks
- Take group photos of the entire class
- Take photos of the experts in action
- Take photos of scenery, other animals, events occurring nearby
- Ensure you get photos of everyone