

EDUCATOR PACKET

This packet provides information on a range of data gathering activities that comprises A Day in the Life of the Indian River Lagoon. Please familiarize yourself with the procedures and protocols prior to the event. **Please familiarize yourself with the procedures and protocols associated with the five groups prior to the event.**

We depend on our partners to collect reliable and trustworthy data and therefore suggest that if time is limited, biological sampling and chemical analysis be prioritized. Please be sure to email your results to Missy Weiss mweiss@teamorca.org within 3 days of collection! Thank you so much for being a part of this citizen science research project and community collaboration to better understand the Indian River Lagoon.

*Be sure to record **TIME & UNITS OF MEASURE** for each sampling item so that comparisons can be made throughout the river.

-THE BASICS-

Sampling site: _____

Latitude: _____ Longitude: _____ * in decimal degrees (DD): Ex. 41.40338, 2.17403

School Name: _____ District: _____

Primary teacher name: _____ Email & phone: _____

Environmental partner(s): _____

Number of student participants: _____ Grade level/ages: _____

Number of adults: _____ Total # of Participants: _____

Chain of Custody: _____ (pre-assigned code) **Date:** _____

-EQUIPMENT CHECK LIST-

- GPS or Phone App (Latitude/ Longitude in decimal degrees)
- Clipboards
- Pencils/ pens
- Colored pencils*
- Dowel marked in 10cm increments*
- Timer
- Compass
- Calculator
- Floatable object (orange, heavy stick, coconut)
- Anemometer*
- Transect tape (metric)
- Air Thermometer
- Sediment core
- Rubber Mallet
- Tray
- Ruler
- Ziploc bags*
- Clear bins or totes for fish collection
- Bubblers*
- Buckets
- Seine net (and/or other collection tool, i.e. cast net, dip nets, etc.)
- Binoculars*
- LaMotte Low Cost Estuary & Marine Water Monitoring Kit (DO, pH)
- Hanna handheld colorimeter (4)(Alkalinity, Phosphate, Nitrate, Nitrite)
- Water thermometer on a string
- Salinity tool (hydrometer, refractometer, probe, etc.)
- Turbidity tool (short sight tube, long sight tube, secchi disc, etc.)
- Device to take photographs (phone, ipad, GoPro)
- Notebook/ Field journal

**Not required, but helpful*

-ORDER OF OPERATIONS-

Break students up into 5 groups. ***Group 1 and 2 are the highest priority.** If you have less than 5 groups, lower priority tasks can be divvied up after higher priority tasks are completed.

Group 1 CHEMICAL ANALYSIS ***High Priority**

- **Group 1 A**
 - Water Temperature & Dissolved Oxygen
 - PH, Salinity, & Turbidity
 - Fecal Coliform Bacteria
- **Group 1 B**
 - Phosphates
 - Nitrates
 - Nitrites
 - Alkalinity

Group 2 BIOLOGICAL SURVEY ***High Priority**

- Aquatic Survey
- Habitat Association Survey

Group 3 PHYSICAL STATION

- Site Background Information
- Tides & Currents
- Weather & Wind

Group 4 SITE DESCRIPTION

- Physical Characteristics
- Site Map
- Sediment Sampling

Group 5 DOCUMENTATION *These students can be embedded in groups 1-4

- Photos (Site, Organisms, & Teammates)

-GROUP 1: CHEMICAL ANALYSIS-

Before beginning, split Group 1 in half.

Carefully read through the directions prior to each procedure.

Group 1A is responsible for:

- Water Temperature
- Dissolved Oxygen (DO)
- pH
- Salinity & Turbidity
- Fecal Coliform

Group 1B is responsible for:

- Nitrate
- Nitrite
- Phosphate
- Alkalinity

Water temperature, dissolved oxygen (DO), salinity, pH, and nutrients are important factors to study when learning about a specific study site. Organisms are adapted to survive in a specific range of temperatures, pH, DO, and salinity before they become stressed and nutrient levels can impact the water quality.

- Materials:**
- * Pencil
 - * Water thermometer
 - * Clipboards
 - * Salinity tool (refractometer, hydrometer, probe, etc.)
 - * Distilled water (only if measuring salinity using LaMotte)
 - * Turbidity tool (short sight tube, secchi disc, probe)
 - * LaMotte Water Monitoring Kit (DO, pH)
 - * Hanna handheld colorimeters (4)

WATER TEMPERATURE

1. In succession, record in situ water temperature in BOTH Fahrenheit and Celsius every 15 or 30 minutes and then average the results. It is best to calculate average water temperature several times throughout the day, especially in shallower, backwater areas, as you may see greater variation over time.

1st Reading	°F
<i>Time:</i>	°C
2nd Reading	°F
<i>Time:</i>	°C
3rd Reading	°F
<i>Time:</i>	°C
Average Water Temperature	°F
Average Water Temperature	°C

To calculate Celsius from Fahrenheit:

$$^{\circ}\text{C} = (\text{---}^{\circ}\text{F} - 32) \times 0.556$$

To calculate Fahrenheit from Celsius:

$$^{\circ}\text{F} = (1.8 \times \text{---}^{\circ}\text{C}) + 32$$

DISSOLVED OXYGEN (DO)

The amount of DO in the lagoon is one of the most important indicators of its health. Many variables influence DO including temperature, time of day, abundance of vegetation, salinity, and wind conditions. DO measurements are read in units of **mg/L**, **ppm**, and/or as **percent saturation**. Plants and wind can add oxygen to the water and animal respiration can subtract oxygen from the water. Therefore, at night when plants are not producing oxygen, organisms in the water are continuing to respire.

1. Circle the DO method:

LaMotte Monitoring Kit

Other _____

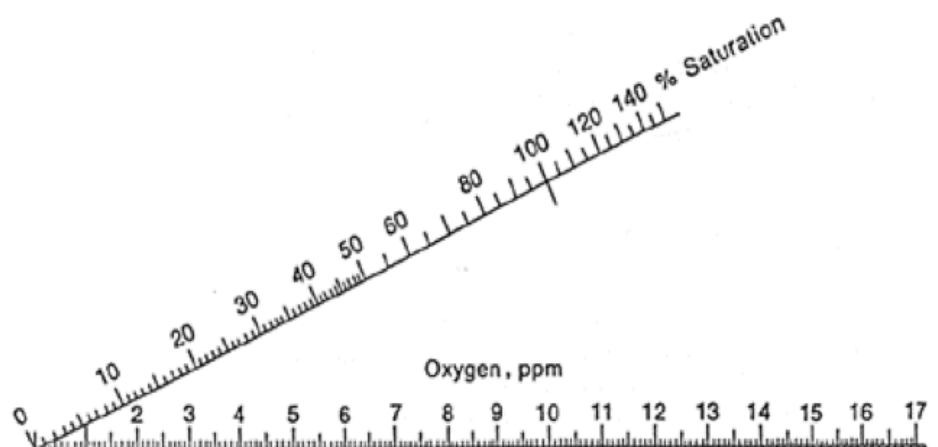
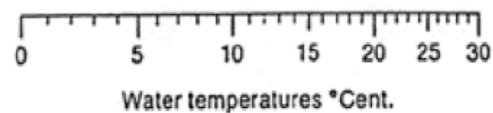
2. Measure DO three times and then average the results. Record measurements below:

	Time	DO	Units	% saturation (see chart below)
1st Reading				
2nd Reading				
3rd Reading				
Average	X			

PERCENT SATURATION

Pair up the measured mg/l of DO with the temperature of the water (in ° C) and draw a straight line between the two values (use a straight edge).

The % saturation is the value where your drawn line intercepts the angled saturation scale. Waterways with a saturation value of 90% or greater are generally considered healthy.



WATER pH:

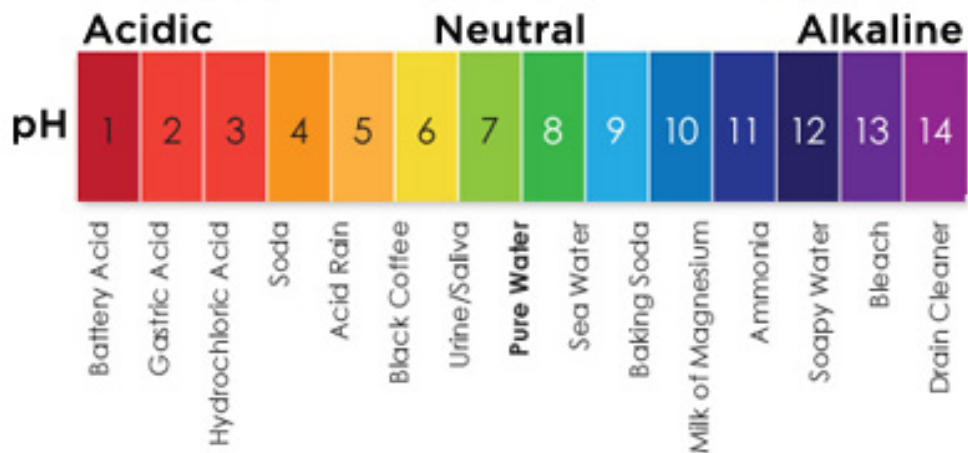
Most aquatic organisms are adapted to survive in a pH range of 6.8 - 8.0.

1. Circle the pH measuring method: LaMotte Monitoring Kit *(preferred) Litmus paper

Meter (identify) _____ Other _____

2. Determine site pH by averaging three different readings, from three different locations.

	Time	PH	Units
1st Reading			
2nd Reading			
3rd Reading			
Average	X		



SALINITY & TURBIDITY

Salinity and turbidity are factors that scientists study to better understand a specific study site. Organisms are only adapted to survive in a specific range of salinity and increased turbidity can negatively influence the biodiversity of the estuary or river.

SALINITY

Salinity is the measure of ‘total salts’, ‘conductivity’, or more specifically the concentration of Chloride ions (Cl⁻). In freshwater parts of the lagoon, the unit of measurement may be parts per million (ppm) or milligrams per liter (mg/ L). These two units are equivalent. In saltier parts of the lagoon, you may measure salinity in parts per thousand (ppt): one part per thousand equals 1000 mg/ L.

1. Circle the salinity measuring method:

Hydrometer



Refractometer



Other: _____



Scan here for a short video tutorial on how to measure salinity.

2. Record salinity 3 times at 3 different locations within your site and then average the results.

Time	Reading 1	Reading 2	Reading 3	Average

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.

1. Circle the turbidity measuring method:

Secchi disc (cm)

LaMotte Monitoring Kit

Scan here for a short video tutorial on how to use a secchi disk to measure turbidity.



Long sight tube (cm)

Short sight tube (JTU)

Probe/Meter (identify)

Probe/Meter _____ (units) Other _____ (units)

2. Record turbidity 3 times at 3 different locations within your site and then average the results.

Time	Reading 1	Reading 2	Reading 3	Average	Units

FECAL COLIFORM BACTERIA

Mammals produce fecal coliform bacteria and when found in water, can reliably indicate the presence of human sewage, agricultural waste, and/or pet waste. Specific tests can identify which source of fecal coliform is present.

1. Record fecal coliform levels using the LaMotte Monitoring Kit.

***Note: This test requires 48 hours* A teacher or partner organization should keep vial to complete test after 48 hour waiting period.**

	Location of Collection	Time of Collection	Negative or Positive
LaMotte Monitoring Kit			

NUTRIENTS

Nitrogen (nitrate, nitrite or ammonium) and phosphorus are the most critical nutrients because of their role in stimulating primary production. It is important to remember that in a healthy, well-balanced ecosystem, nutrients are required for organisms to grow, survive and decompose. Nutrients are constantly being recycled between living and non-living parts of an estuary ecosystem. Nutrients only become a problem when the amounts entering the ecosystem are too great – this is called eutrophication. Eutrophication can have devastating impacts on a marine environment. Nutrients come from a variety of agricultural, urban and industrial sources.

PHOSPHATE

Phosphate is a nutrient required for plant and animal growth. High levels of phosphate can result in the overgrowth of plants, increased bacterial activity and decreased dissolved oxygen levels.

1. Record phosphate levels using the Hanna handheld colorimeter. Measure phosphate three times at three different locations and average the results.

Time	Reading 1	Reading 2	Reading 3	Average	Units

NITRATE

Nitrate is necessary to build protein in all aquatic plants and animals. Excess levels of nitrate cause increased plant growth and decay, enhanced bacterial decomposition, and consequently a decrease in dissolved oxygen.

1. Record nitrate levels using the Hanna handheld colorimeter. Measure nitrate three times at three different locations and average the results.

Time	Reading 1	Reading 2	Reading 3	Average	Units

NITRITE

Nitrite is a key intermediate between NO_3^- and NH_4^+ , so there are several potential pathways, both oxidative and reductive, that might lead to its accumulation in sea water. Nitrites come from fertilizers through run-off water, sewage, and mineral deposits. Unfortunately it can also stimulate the growth of bacteria when introduced in high levels into a body of water.

1. Record nitrite levels using the Hanna handheld colorimeter. Measure nitrite three times at three different locations and average the results.

Time	Reading 1	Reading 2	Reading 3	Average	Units

ALKALINITY

The buffering capability of water to resist acidification.

1. Record nitrite levels using the Hanna handheld colorimeter. Measure alkalinity three times at three different locations and average the results.

Time	Reading 1	Reading 2	Reading 3	Average	Units

-GROUP 2: BIOLOGICAL SURVEY-

***This sampling should NOT BEGIN until WATER SAMPLES have been collected and TURBIDITY has been checked by Group 1.**

Carefully read all directions before beginning the procedure.

An aquatic biological survey quantifies (counts) and identifies each species of fish and macro-invertebrate caught during a collection. Generally, greater the biodiversity indicates a healthier sampling site.

Materials:

* Pencil	* Clipboards
* Measuring tape/ruler	* Binoculars
* Collection buckets	* Reference guide
* Bubblers (optional but recommended)	* Net(s) for collection (seine, dip nets, plankton, fish pot etc.)

BIOLOGICAL INVENTORY USING A SEINE NET



Scan here for a short video tutorial on how to seine.

1. Measure the length, width, and mesh size of your seine net. This can be done prior to ADIL or during the ADIL event.

Length of the seine net _____ meters / feet

Width of seine net _____ meters / feet

Mesh size _____ mm

** If you used ORCA's equipment bin, the dimensions can be found on the seine net pole.*

2. Determine who will be seining and who will be on the shoreline filling buckets and bins with fresh seawater.

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).

***To measure the distance, one student should stand on shore at the starting location between the two students.**

B. Fill bins with fresh, cool seawater.

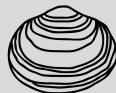
C. Be ready to help sift though the haul.

4. Haul seine to the shoreline.

A. Working quickly, collect all fish and gently place into buckets

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

A **macro-invertebrate** is an organism that is easily visible without magnification and does not have a vertebrate or backbone! Some common examples of macro-invertebrates include: crabs, horseshoe crabs, barnacles, clams, oysters, snails, shrimp, jellyfish, worms, and so much more!

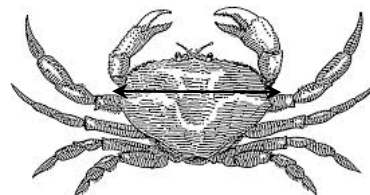
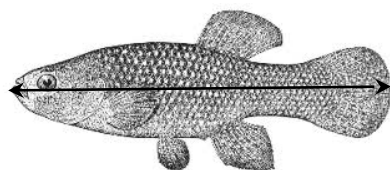


5. To the best of your abilities, identify each organism, at the species level, using the reference guides. Fill out the data chart. Have your Documentation Team take pictures of each species that you observe, especially those that you are unsure of! For unknown species, name them as "Mystery fish 1, 2,3..."

[Scan here for a short video tutorial on how to measure biodiversity.](#)

6. Count the total of each species pulled from the seine net.

7. Measure the largest individual of each species.



Examples of how to measure fish length or shell length.

COLLECTION # 1 *Use a separate sheet for each seine OR note what was caught in each seine by noting the haul number.

1. Which collection method did you use?

_____ Seine Net (list dimensions and mesh size)
_____ Cast Net _____ Dip Net _____ Other (please identify)

FISH SPECIES CAUGHT

Fish Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

MACRO-INVERTEBRATE SPECIES CAUGHT

Macro-invertebrate Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____

COLLECTION # 2 *Use a separate sheet for each seine OR note what was caught in each seine by noting the haul number.

1. Which collection method did you use?

_____ Seine Net (list dimensions and mesh size)
 _____ Cast Net _____ Dip Net _____ Other (please identify)

FISH SPECIES CAUGHT

Fish Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

MACRO-INVERTEBRATE SPECIES CAUGHT

Macro-invertebrate Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____

COLLECTION # 3 *Use a separate sheet for each seine OR note what was caught in each seine by noting the haul number.

1. Which collection method did you use?

_____ Seine Net (list dimensions and mesh size)
 _____ Cast Net _____ Dip Net _____ Other (please identify)

FISH SPECIES CAUGHT

Fish Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

MACRO-INVERTEBRATE SPECIES CAUGHT

Macro-invertebrate Species	# of Individuals	Size of Largest	Units
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____

CATCH PER UNIT EFFORT (CPUE) **Optional*

In fisheries and conservation biology, the catch per unit effort is an indirect measure of the abundance of a target species. Changes in the catch per unit effort are inferred to signify changes to the target species' true abundance.

CPUE

Let's use a 50 ft. net for the example. Take length of net (50 ft.) X length of pull (example 7 yards X 3 = 21 ft.) then convert it to meters - 50 ft. X 21ft X 12 (for inches per foot) = total inches. Divide by 39.37 inches for inches in a meter = 320 meters. Then divide your catch by 320 to get catch per meter seined. This figure should be computed for each seine event.

If you pull the net in just to close a circle the formula is: Net Length (ft.) ___ X 12 = total inches / 39.37 (inches in a meter) = ____ Then divide your catch by this number for your CPUE.

Collection 1: Time _____ Catch Total _____ Length of Pull _____ CPUE _____

Collection 2: Time _____ Catch Total _____ Length of Pull _____ CPUE _____

Collection 3: Time _____ Catch Total _____ Length of Pull _____ CPUE _____

HABITAT ASSOCIATION SURVEY

A habitat association survey is an important record of the various organisms (birds, mammals, etc.) that are observed at your study site.

- Materials: * Pencil
- * Binoculars
- * Clipboards

SURVEY

1. Spend some time observing the area around your study site. Using binoculars if possible, identify and count birds, mammals or other organisms seen during your visit to your study site. Record the organisms in the chart below. These are in addition to any organisms caught using nets in the river. Other teams' observations of animals should be included as well. (Ex. Great Blue Heron, Seagull, Tiger Beetle, Dragonfly, Butterfly)

Species	Tally	# of Individuals
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____
9. _____	_____	_____
10. _____	_____	_____

-GROUP 3: PHYSICAL STATION-

*Carefully read all directions before beginning the procedure!

SITE INFORMATION

Site Name: _____ County: _____

Latitude: _____ Longitude: _____

Chain of Custody: _____ Partner: _____

TIDES

Tides are the 'up and down' motion or 'rising and falling' of water caused by the gravity of the Moon on our Earth. Some bodies of water experience 2 high tides and 2 low tides each day, but that is not always the case in the Indian River Lagoon (IRL) or in other parts of the world.

- Materials:
- * Pencil
 - * Tape Measure
 - * Clipboards
 - * Timer
 - * Two long, slender, strong sticks
 - * Dowel marked in 10cm increments (optional method)



[Scan here for a short video tutorial on how to measure the tidal change.](#)

TIDE MEASUREMENT

This can be determined by using the 'multiple stick method' (described below) or a wooden dowel marked in 10cm increments.

- 1. Insert one stick deep into the sediment at exactly the water's edge. Use your best judgment where the water's edge is if waves are present. Make sure the stick is not placed in a location that will interfere with other teams!**
- 2. After 10 minutes, check your tide marker. If the water's edge has moved in either direction, use the second stick to mark the new edge. Do not move the first stick!**
- 3. Measure the distance between the first and second stick to get a change in tide, and then continue measuring the tidal change throughout your time.**

Time	Rising, Falling, unchanged	Height in cm	Rate of Tidal Change (cm/min)

- 4. Overall, is the tide rising, falling or remaining unchanged? _____**

CURRENTS

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

Materials: * Pencil * Clipboards
 * Calculator * Timer
 * Tape Measure * Floatable objects (oranges, heavy stick, coconut)
 * Compass

CURRENT DIRECTION

1. Toss a floatable object into the middle of the lagoon to allow the 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 water current direction (east, west, etc.). _____
4. What type of object did you use to measure current direction? _____

CURRENT SPEED



Scan here for a short video tutorial on how to measure the current speed.

1. At the starting point, Student #1 stands at the water's edge and tosses the floatable object into the water.
2. Allow the object to float/move 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.
3. Using the metric measuring tape, record the distance between Student #1 and Student #2.
4. Determine current speed three times at three different locations within your site. Calculate the average current speed in cm/sec. Record results below.

	Location	Time	Distance traveled (cm)	Direction (N,S,E,W)	Current speed (cm/sec)
Trial 1		60 seconds			
Trial 2		60 seconds			
Trial 3		60 seconds			

Average current speed = _____ cm/sec

***Current speed calculation example:** Julia's orange traveled 125 cm in 60 seconds.
 Her current speed = $\frac{125\text{cm}}{60\text{ seconds}}$

Current speed = 2.08 cm/ second

WEATHER

Weather is an important piece of physical data that helps to provide context for other data. Weather includes current conditions and recent conditions over the last few days that may impact water quality of the lagoon such as rain and extreme temperatures.

- Materials:
- * Pencil
 - * Thermometer
 - * Compass
 - * Calculator
 - * Clipboards
 - * Anemometer (measures wind speed) (optional)

WEATHER CONDITIONS

1. Briefly describe the weather for the last 3 days: any wind, rain, or unusual temperatures?

AIR TEMPERATURE

1. Record air temperature in BOTH Fahrenheit and Celsius.

**Note: Place your thermometer in a shady location, if possible*

Time _____ Air Temperature _____ °F Air Temperature _____ °C

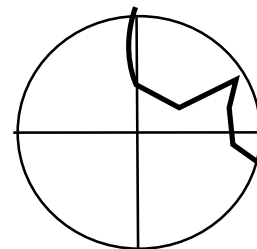
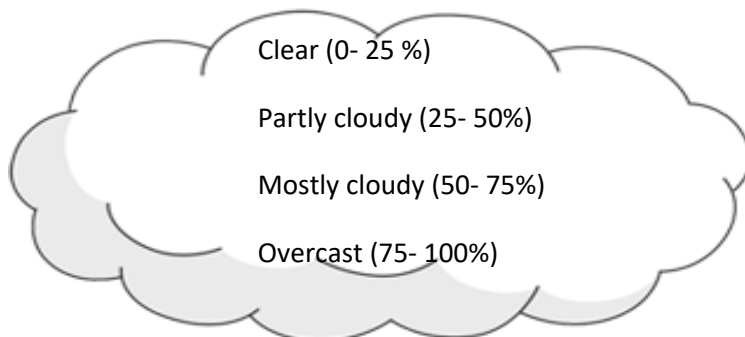
*If your thermometer is not able to read both Fahrenheit and Celsius, then you will need to use the conversion calculations to assist you.

To calculate Celsius from Fahrenheit: $^{\circ}C = (\text{ } ^{\circ}F - 32) \times 0.556$

To calculate Fahrenheit from Celsius: $^{\circ}F = (1.8 \times \text{ } ^{\circ}C) + 32$

CLOUD COVER

1. Estimate cloud cover (CIRCLE one below)



Ex. Approximately 25% cloud cover

WIND DIRECTION & SPEED

Wind levels can increase choppiness in the water adding oxygen to it. This is important for many of the animals that live in the river and estuary. Wind can affect the movement of surface water, making it difficult to determine current direction and speed.

1. Record wind direction as the direction the wind is coming (blowing) from _____
2. Circle the descriptive word that best describes the conditions of the water.

Virtually flat Calm Rippled Choppy

3. Using the Beaufort Scale (see below) figure out which Beaufort Force # best describes wind speed. _____

Optional: Using an anemometer, record wind speed: _____ knots or _____ mph



Scan here for a short video tutorial on how to measure wind speed and direction.

Beaufort Scale

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

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

-GROUP 4: SITE DESCRIPTION-

**Carefully read all directions before beginning the procedure!*

What are the physical characteristics of a site?

The physical characteristics of a sampling site are the geographic features. This includes trees, shrubs, dunes, lagoon, buildings, parking lot, etc.

- Materials:
- * Pencil
 - * Colored pencils (optional)
 - * Clipboards

SHORELINE APPEARANCE

1. Walk down to the shoreline. Check all of the characteristics that apply to the appearance of your shoreline.

Sandy	Bulkhead/Seawall	Vegetated (grasses, shrubs)
Road Ending	Rocky	Pipe entering lagoon
Gentle beach slope	Steep slope	Pier
Riprap (large amounts of rocks piled up)	Garbage	Other:

2. What are some other noteworthy features or characteristics of your sampling site? (Ex. Are people fishing, swimming, launching boats, picnicking, or other activities)

3. Circle the predominant lagoon bottom type.

Sandy Muddy Rocky Weedy Unable to determine

4. What percentage of the lagoon bottom is covered in vegetation? Check one.

_____ 0-25% _____ 25-50% _____ 50-75% _____ 75-100%

*If possible, identify the type of vegetation or provide photo evidence?

5. What percentage of the lagoon surface is covered in vegetation? Check one.

_____ 0-25% _____ 25-50% _____ 50-75% _____ 75-100%

*If possible, identify the type of vegetation or provide photo evidence?

SKETCH A SITE MAP

Locate your sampling site. Begin sketching 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.

SEDIMENT

Sediment is solid matter that can be moved and deposited by wind and water. It comes in many forms and sizes and from a variety of sources. Collecting a sediment core and studying the different layers, organisms, and gases in the core is a helpful way of determining the geographic profile of an area. The amount of time represented by your core will range depending upon the location chosen and the processes of weather, current, and sedimentation. In areas with high deposition, it might be only a few weeks represented versus in other areas the same length of core might represent decades. You may notice that the coloration of sediments varies, indicative of varying amount of oxygen. Generally, sediments that are sandy or at the surface of the core are higher in oxygen versus those that are composed of finer particles or at depth that are generally lower in oxygen or anoxic.

- Materials:**
- * Pencil
 - * Ruler
 - * Tray/ bin
 - * Clipboards
 - * Sediment Corer (tube, rubber mallet)
 - * Ziploc bag (*optional for taking sample back*)

SEDIMENT CORE COLLECTION

1. With the assistance of an adult, find an area in the water where the sediment is soft enough to push the end of a sediment corer into. Push the sediment core into the bottom at least 3/4 of the way down. You may have to try several locations or use the rubber mallet to help get a good length into the substrate. Choose a spot that is not too deep for your team to work.



[Scan here for a short video tutorial on how to extract a sediment core.](#)

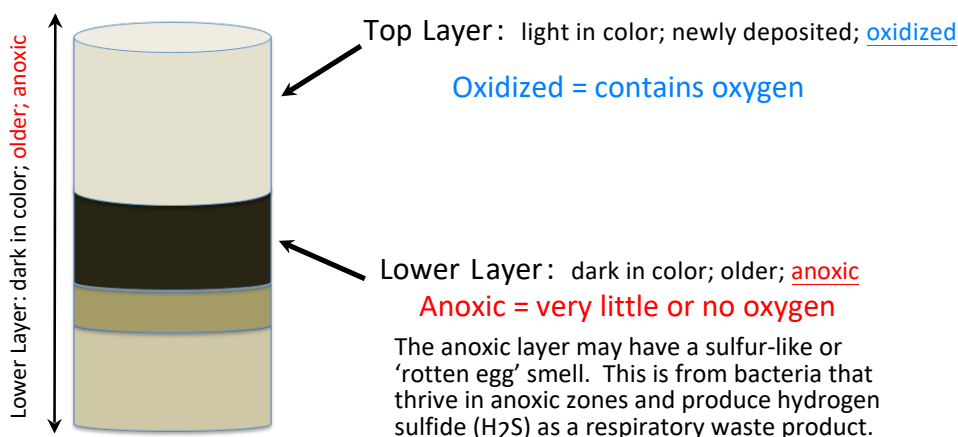
2. Carefully, withdraw the sediment corer from the water. Keep the core upright as you move it to collection tray or bin for observation. Position one hand on the bottom of the corer and the other on the top (see photo below) to keep the sample steady. Let the water drain.

3. Slide the sediment core out of the tube onto the tray or bin.

A. Total length of your sediment core _____ cm

B. Length of **oxidized layer** (if present) _____ cm

C. Length of **anoxic layer** (if present) _____ cm



4. Sketch a detailed picture of the sediment sample

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

5. 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)					
Sand (gritty; fine sand paper)					
Gravel (pea-sized sediment)					
Pebbles (larger than pea-sized)					
Shell(s)					
Macroinverts (worm, crab, snail, etc.)					
Muck (thick ooze, black in color)					
Plant material (leaves, grass, etc..)					
Other:					

-GROUP 5: DOCUMENTATION-

**Review 'Important Recommendations' at the bottom of this section*

Your responsibility is to record images and information about the ADIL event. By taking digital pictures, short videos, asking questions and even interviewing the experts, you will gather information that may prove very valuable to the scientific data collected. You will also have handy images that can be used to demonstrate the groups' accomplishments.

Materials: * Pencil
 * Notebook
 * Digital cameras/ Documenting tools

PHOTOGRAPHS OF SITE, ORGANISMS & TEAMMATES

1. Assign each student in this Documentation group to another group/station to observe.
2. Write their names next to the assigned team below:

Group 1 (Chemical Station) _____

Group 2 (Biological Station) _____

Group 3 (Physical Station) _____

Group 4 (Site Description) _____

3. Students should document the procedures and discoveries made throughout the day using their artistry and creativity to get interesting angles, compositions and scenery. Keep track of the photos and videos you have taken by writing them down in your journal or on the back of this paper. This is especially valuable when trying to determine unknown species collected at the Biological Station. Feel free to interview your classmates, teachers, environmental partners, and others while participating in ADIL.

4. It may not be necessary to write down each and every photograph, so record them in blocks so that when reviewing the images, you have an idea of who or what is in each photo. (For example: "1-7 group preparing at site")

Important Recommendations

- *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, and events occurring nearby