



**A 'DAY IN THE LIFE' OF THE HUDSON RIVER ESTUARY  
October 16, 2014**

<http://www.ldeo.columbia.edu/edu/k12/snapshotday/>

**IF YOU ARE SUBMITTING STUDENT FORMS PLEASE INCLUDE THIS  
COVER SHEET**

**The recording sheets contain a variety of data gathering activities. Any combination of these activities can be completed as part of Day In The Life. Additional activities to support your field experience are available on the event website link above.**

**Please be sure to submit your results to Margie Turrin (845-365-8179 (fax) or e-mail [mkt@ldeo.columbia.edu](mailto:mkt@ldeo.columbia.edu)) within 24-48 hours of collection! Questions? 845-365-8494. PLEASE include this cover sheet with any data sheets your submit. THANK YOU!**

**PLEASE BE SURE TO RECORD TIMES & UNITS OF MEASURE SO THAT  
RESULTS CAN BE COMPARED AT DIFFERENT SPOTS ON THE HUDSON**

RECORDING SHEET I - BACKGROUND INFORMATION.

1. Site contact person \_\_\_\_\_  
Organization \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
phone \_\_\_\_\_ fax \_\_\_\_\_ email \_\_\_\_\_
2. School/group name \_\_\_\_\_ District \_\_\_\_\_  
Name of teacher/group leader \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
phone \_\_\_\_\_ fax \_\_\_\_\_ email \_\_\_\_\_  
Number of school students \_\_\_\_\_ Number of Adults \_\_\_\_\_  
grade level/High School course \_\_\_\_\_
3. Where are you sampling. Please be as specific as possible.  
(Example: swimming beach, Kingston Point, City of Kingston, Ulster County.)  
\_\_\_\_\_
4. Using the map included with your packet, give your location along the Hudson estuary in river miles. (The Battery at the southern tip of Manhattan is River Mile 0; the Federal Dam at Troy is River Mile 153.)  
River mile \_\_\_\_\_

If you have a way to determine the latitude and longitude of your site, enter that here.

GPS Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Name \_\_\_\_\_ DITL 2014 Observing Surroundings Location \_\_\_\_\_

Let's look at your sampling site. At this station we will describe the site and any plants in and around your collection area. Include plant materials in the water, as well as along the water's edge.



1. Sketch your sampling site. Be sure to include a compass rose showing N/S/E/W and locate the River on your sketch, and note your sampling site.

2. What type of <b>land</b> do you see around your sample site? Check all that apply.	<input type="checkbox"/> Pier <input type="checkbox"/> Grassy <input type="checkbox"/> Forested <input type="checkbox"/> Parking Lot
3. What is the <b>area's main use</b> ? Check all that apply	<input type="checkbox"/> Boating <input type="checkbox"/> Picnics <input type="checkbox"/> Swimming <input type="checkbox"/> Fishing <input type="checkbox"/> Jogging <input type="checkbox"/> _____
4. Provide the following <b>uses as percentage</b> of 100 (for example 50% is half the usage)	<input type="checkbox"/> Urban/residential <input type="checkbox"/> Forested <input type="checkbox"/> Industrial/commercial <input type="checkbox"/> Beach <input type="checkbox"/> Other _____
5. Describe the <b>shoreline</b> - check all that apply below and in next column:  <input type="checkbox"/> Sandy <input type="checkbox"/> Muddy <input type="checkbox"/> Rocky	<input type="checkbox"/> Beach <input type="checkbox"/> Covered in vegetation <input type="checkbox"/> Banks altered <input type="checkbox"/> RipRap (Large rocks) <input type="checkbox"/> Wood Bulkhead <input type="checkbox"/> Concrete Bulkhead <input type="checkbox"/> Pipe entering the water
6. Describe the <b>water area</b> at the sampling site	<input type="checkbox"/> Depth <input type="checkbox"/> Bottom sandy <input type="checkbox"/> Bottom muddy <input type="checkbox"/> Bottom rocky <input type="checkbox"/> Bottom weedy
7. Describe the <b>water itself</b>	<input type="checkbox"/> Calm <input type="checkbox"/> Choppy
8. <b>Plants</b> that you have identified & percent of total area covered.	% _____ Plant _____ % _____ Plant _____ % _____ Plant _____ % _____ Plant _____

**Observations**

What do you see in the area? Are there flecks of brick on the ground? lumps of coal? water chestnut seeds (devil's heads), shell pieces or full shells? Crab shells? Is it overgrown?

From observations you have collected here can suggest of any that might "impact" the data you are collecting here?

**What else do you see?** Birds? Animals? Butterflies? Dragonflies? What else?

**The river is used for business and pleasure. Record how it is being used.**

**9. Commercial traffic:** Record any large boats, tugs, or barges traveling on the Hudson. Please record the name and color! A loaded barge is full of cargo and rides lower in the water than a light one.

Time:	name	color	North or Southbound	loaded or light
<hr/>				
Time:	name	color	North or Southbound	loaded or light
<hr/>				
Time:	name	color	North or Southbound	loaded or light
<hr/>				

**8. Recreational Traffic:** List recreational vessels you see on the Hudson (sail, speedboats)

Time:	name	color	North or Southbound	loaded or light
<hr/>				
Time:	name	color	North or Southbound	loaded or light
<hr/>				
Time:	name	color	North or Southbound	loaded or light
<hr/>				

Name \_\_\_\_\_ **DITL 2014 Physical Conditions Data** Location \_\_\_\_\_  
 (weather, tides, currents)

1. **Location:** We will be comparing data with other groups along the Hudson, so it is important to note our exact location. Location Name \_\_\_\_\_  
 Using your Hudson River Estuary map, give your location in *river miles*: \_\_\_\_\_ and if possible  
 GPS Latitude: \_\_\_\_\_ GPS Longitude: \_\_\_\_\_

<p>2. <b>Tides:</b> Tides cause the water of the Hudson River to rise and fall due to the gravitational pull of the sun and the moon. Tides can be measured over time with a <b>Tide Meter Stick</b>, or another marker to see if the water is rising, falling, or staying the same. First record the time, then check the water level using your measuring stick or tape. Check the stick again regularly (every 15 to 30 minutes) and record.</p>	<p>Start time: _____ Water height in cm. ____*</p> <p>Check time: _____ Water height in cm. ____</p> <p>Check time: _____ Water height in cm. ____</p> <p>Check time: _____ Water height in cm. ____</p> <p>Check time: _____ Water height in cm. ____</p> <p>Check time: _____ Water height in cm. ____</p> <p>Check time: _____ Water height in cm. ____</p> <p>*if on a dock measure down from the dock</p>
<p>3. <b>Currents:</b> Currents record the direction of water movement. A current moving downriver is called <i>ebb</i>, a current moving upriver it is called <i>flood</i>, and if there is no current it is <i>still</i>. Toss an orange or a solid stick as far as you can out into the river and watch to see which way it moves. <b>Record: Ebb or Flood or Still.</b> Time its movement for 30 secs and record, then divide by 30 to get per cm/sec of movement.        *To determine knots: measure distance orange or stick travels in 30 secs. Divide by 30 for cm/sec and then divide by 51.4 for knots. The formula for knots is (cm/sec)/51.4</p>	<p>Time: _____ Circle: ebb - flood - still*        __Cm/30secs __Cm/sec __Knots</p> <p>Time: _____ Circle: ebb - flood - still*        __Cm/30secs __Cm/sec __Knots</p> <p>Time: _____ Circle: ebb - flood - still*        __Cm/30secs __Cm/sec __Knots</p> <p>Time: _____ Circle: ebb - flood - still*        __Cm/30secs __Cm/sec __Knots</p> <p>* Note if anything about the shoreline could cause the current near shore to flow in a different direction than the current in the middle of the Hudson?</p>
<p>4. <b>Air Temperature:</b> How to convert:  <math>^{\circ}\text{C} = 0.556 \times (^{\circ}\text{F} - 32^{\circ})</math>  <math>^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32^{\circ}</math></p>	<p>Time: _____ Air temperature: _____<math>^{\circ}\text{F}</math> _____<math>^{\circ}\text{C}</math></p> <p>Time: _____ Air temperature: _____<math>^{\circ}\text{F}</math> _____<math>^{\circ}\text{C}</math></p> <p>Time: _____ Air temperature: _____<math>^{\circ}\text{F}</math> _____<math>^{\circ}\text{C}</math></p>
<p>5. <b>Wind speed:</b> If you use the Beaufort chart record Beaufort force #. If you use a wind meter record number registered AND units.</p>	<p>Time: _____ Beaufort # __ Wind Meter: __ Units ____</p> <p>Wind Direction (comes from) _____</p>
<p>6. <b>Cloud Cover:</b> Select from the scale provided a percentage of cloud cover.</p>	<p>Time: _____</p> <p>__clear __partly cloudy __mostly cloudy, __overcast        (&lt;25%) (26-50%) (51-75%) (&gt;75%)</p>
<p>7. <b>Rain (Precipitation) Today &amp; Weather for the past 3 days:</b> Rain can affect our readings and so can extreme changes in temperature over a short period. We record weather today and for the last 3 days.</p>	<p>Time: ____ Rain ____ If checked note how steadily it rained _____</p> <p>Briefly describe the weather for the last 3 days: Rain, wind, unusual temperatures? _____</p>

Name \_\_\_\_\_ Location \_\_\_\_\_ Time \_\_\_\_\_

**2014 SALINITY Recording Sheet:** When we measure salinity we are measuring the amount of salt present in water. Much of this salt is sodium chloride, just like table salt. The main source of salt in the Hudson is seawater (~35,000 ppm) pushing in from the ocean. There are only small amounts of salt in the fresh water entering the river from the eroding rocks and road salt.

\* Expected Hudson Range: ~40 ppm in the freshwater section to ~29,000 ppm in harbor\*

Put a checkmark in the box next to the measuring method you are using. Follow the instructions for completing the test and then record your results below.

- TITRATOR STRIPS measure chloride by color change (to white) along a scale.

Low Range Tabs \_\_\_\_\_ High Range Tabs \_\_\_\_\_ On strip's scale, white color ends at \_\_\_\_\_.

Read across the conversion table and RECORD: Units \_\_\_\_\_ %NaCl \_\_\_\_\_ mg/L Cl \_\_\_\_\_

- DROP COUNT TEST KITS usually measure chloride using color change as a liquid chemical is added to the sample drop by drop.

How many drops were needed for the sample to change color? \_\_\_\_\_ drops

Number of drops times conversion factor (from instructions) equals chloride concentration.

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ mg/L Cl

- HYDROMETERS measure water's density (its specific gravity) using a floating object. As salinity increases, density increases, and the object floats higher.

If using a plastic hydrometer with a pointer, record salinity here: \_\_\_\_\_ parts per thousand (ppt)

If using a glass hydrometer floating in a water sample: Record the temperature of the water sample \_\_\_\_\_ °C

Record the specific gravity (to the fourth decimal place) from the hydrometer scale where the stem breaks the water's surface. Read at water level, not at the top of the meniscus. \_\_\_\_\_

Record salinity from the specific gravity conversion table: \_\_\_\_\_ parts per thousand (ppt)

- REFRACTOMETERS measure how light is bent—refracted—as it enters water. Refraction varies with density, which in turn varies with salinity (density increases with salinity).

Read salinity where the shadowline crosses the display scale: \_\_\_\_\_ parts per thousand (ppt)

- METERS measure how well water conducts electricity (better as salinity increases). They may show conductivity, salinity, or chloride concentration; be sure to specify units.

Reading \_\_\_\_\_ Units of measurement \_\_\_\_\_

Name \_\_\_\_\_ DITL 2014 Chemical Description Location \_\_\_\_\_

**pH - Expected Range - Most fish prefer 6.5 to 8.5** - pH measures how acidic or basic (alkaline) a solution is measured on a scale from 0 to 14. Neutral is 7.0, Acidic is lower than 7.0 and Basic is higher than 7.0. There are NO UNITS used with pH.

**Circle equipment used for the test:**

Test Strips	color match test kit	meter	pH pen
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____

- \*Salinity - Expected Range - ~40 ppm in freshwater section up to 29,000 ppm in harbor.**

A measure of the amount of salt present in the water (we are measuring the chloride). Ocean salinity is measured in 'Parts per thousand' (PPT). Fresher water with smaller amounts in 'Parts per million' (ppm) or mg/l. (There are other measures of salinity: 'Practical salinity units' (PSU), Conductivity as mS/cm (millisiemens) or uS/cm (Microsiemens) but we focus on ppt and ppm)

**Circle equipment used for the test (what each measures is listed below each equipment):**

Drop count test kit (chloride)	Quantab strips (chloride)	meter (PPT or mS/cm)	refractometer (PPT)	hydrometer (PPT)
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____	( <u>note correct units</u> )
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____	( <u>note correct units</u> )
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____	( <u>note correct units</u> )
Time: _____	Reading 1: _____	Reading 2: _____	Reading 3: _____	( <u>note correct units</u> )

\*(NOTE THERE IS AN INDIVIDUAL CALCULATION SHEET FOR SALINITY)

- Water temperature Expected High Temperature in October would be < 25°C**

Record water temperature in degrees Celsius or degrees Fahrenheit. TO convert between the two

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

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

\* Time: \_\_\_\_\_ water depth ( feet): \_\_\_\_\_

Reading 1: \_\_\_\_\_ °C \_\_\_\_\_ °F

Reading 2: \_\_\_\_\_ °C \_\_\_\_\_ °F

Average: \_\_\_\_\_ °C \_\_\_\_\_ °F

\* Time: \_\_\_\_\_ water depth ( feet): \_\_\_\_\_

Reading 1: \_\_\_\_\_ °C \_\_\_\_\_ °F

Reading 2: \_\_\_\_\_ °C \_\_\_\_\_ °F

Average: \_\_\_\_\_ °C \_\_\_\_\_ °F

\* Time: \_\_\_\_\_ water depth (in feet): \_\_\_\_\_

Reading 1: \_\_\_\_\_ °C \_\_\_\_\_ °F

Reading 2: \_\_\_\_\_ °C \_\_\_\_\_ °F

Average: \_\_\_\_\_ °C \_\_\_\_\_ °F

<p><b>Observations</b></p> <p>Describe your water collection site -</p> <p>___ direct sun</p> <p>___ shade</p> <p>___ Covered with plants</p> <p>___ Water very still</p> <p>What else should we know about your sampling?</p>
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• **Dissolved oxygen (DO)** **Healthy Expected Range 5.0-11.0 mg/L**

The amount of dissolved oxygen in the water is one of the most important factors in telling how healthy that ecosystem is. Many variables affect DO, including temperature, time of day, presence of plants, and wind conditions. DO measurements are given in mg/l and as percent saturation. 100% saturation means that the water cannot hold any more oxygen at that temperature. If more oxygen is added (such as by a high wind or a waterfall) the oxygen will go from the water into the air. **Circle**

**equipment used for the test:**

meter                      drop count kit                      other

For test temperature use average from #3 above. For % saturation calculation use chart on bottom of page.

\* Time: \_\_\_\_\_ Water temperature in °C \_\_\_\_\_ DO (mg/l) or PPM: \_\_\_\_\_ % saturation \_\_\_\_\_

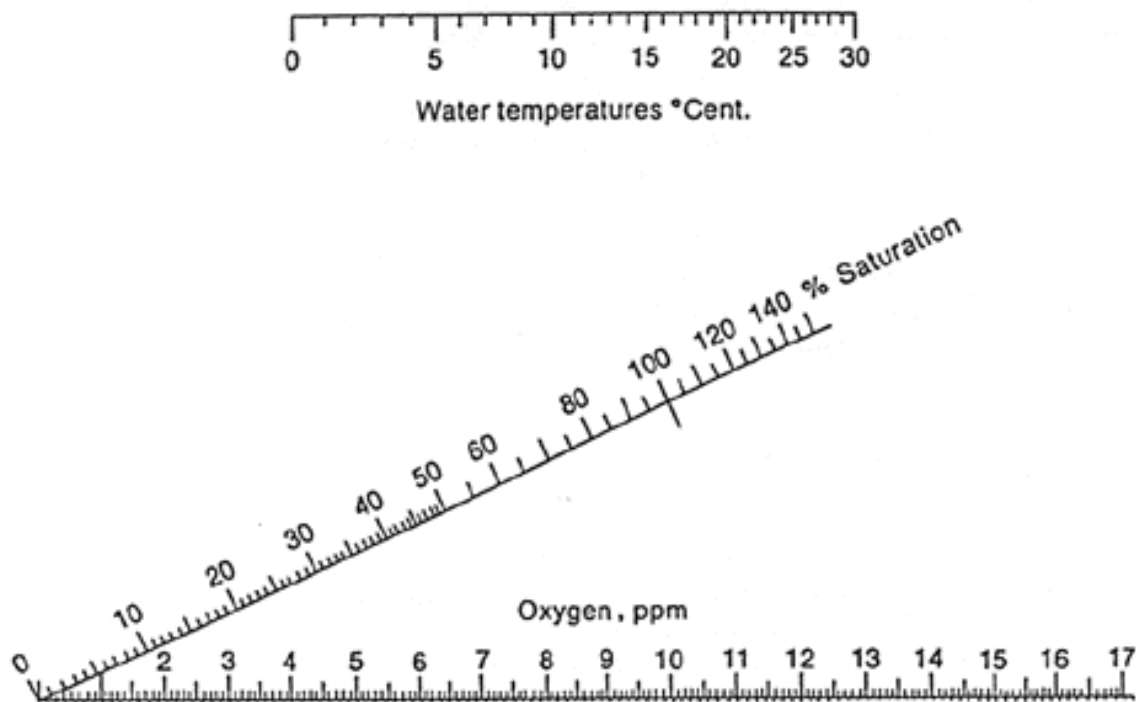
\* Time: \_\_\_\_\_ Water temperature in °C \_\_\_\_\_ DO (mg/l) or PPM: \_\_\_\_\_ % saturation \_\_\_\_\_

\* Time: \_\_\_\_\_ Water temperature in °C \_\_\_\_\_ DO (mg/l) or PPM: \_\_\_\_\_ % saturation \_\_\_\_\_

**5. % Saturation of Dissolved Oxygen (DO) Healthy Expected Range 90% or above**

Source of chart: <http://waterontheweb.org/under/waterquality/oxygen.html>

For a quick and easy determination of the percent saturation value for dissolved oxygen at a given temperature, use the saturation chart below. Locate your DO reading on the bottom scale (ppm equals mg/L). Locate the temperature of the water in degrees C on the top scale. Draw a straight line between the temperature and DO. The % saturation is the value where the line intercepts the saturation scale.

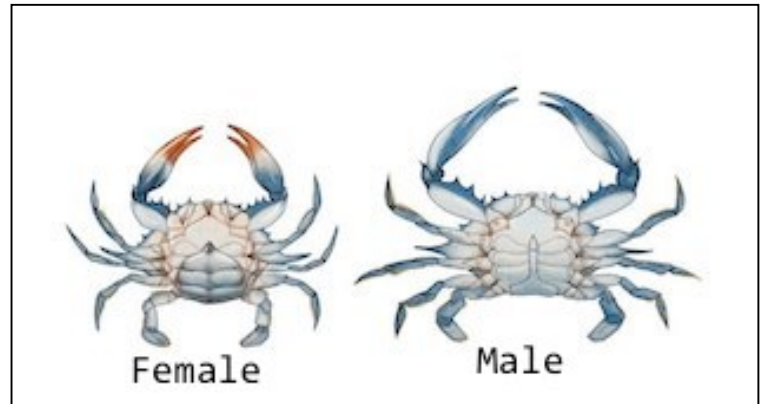


Name \_\_\_\_\_ DITL 2014 Fish and Macroinvertebrates ID Location \_\_\_\_\_  
 Please use separate sheet for each seine OR note what was caught in each seine by noting  
 seine #.

TIME _____	LENGTH OF NET _____		
Fish Species:	# of individuals:	Size of largest (unit)	
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____

**Macroinvertebrates (For crabs include  
 type (blue, mud, Asian etc.) & sex (M/F)**

1. \_\_\_\_\_ # \_\_\_\_\_
2. \_\_\_\_\_ # \_\_\_\_\_
3. \_\_\_\_\_ # \_\_\_\_\_
4. \_\_\_\_\_ # \_\_\_\_\_
5. \_\_\_\_\_ # \_\_\_\_\_
6. \_\_\_\_\_ # \_\_\_\_\_
7. \_\_\_\_\_ # \_\_\_\_\_
8. \_\_\_\_\_ # \_\_\_\_\_
9. \_\_\_\_\_ # \_\_\_\_\_



If your group can compute Catch Per Unit Of Effort Please Record This here.  
 Seine # \_\_\_ Time \_\_\_ Catch Total \_\_\_ Length of Pull \_\_\_ Computed CPUE \_\_\_\_\_



Name: \_\_\_\_\_ 2014 Turbidity/Chlorophyll Location: \_\_\_\_\_

1. **Turbidity** is a cloudiness of the water. Light can penetrate farther in clear water than it can in turbid water. Estuaries like the Hudson River are naturally turbid. Turbidity can be caused by small plants, animals, salt, sand and mud. Measure the turbidity at your site on the river - be careful if you are collecting water for a site tube NOT to step in the water as you collect it or you will add turbidity to your sample.

Time: \_\_\_\_\_ Circle equipment used

- 1) Secchi disk (cm) 2) Long Sight tube (cm) 3) Short Site Tube (JTU) 4) Turbidimeter (NTU)

_____	_____	_____	_____
Reading	Reading 2	Reading 3	Average
(Make sure that you <b>RECORD</b> the correct unit for the piece of equipment that you are using; feet, cm, meters, JTU's or NTU's)			

### Observations

Is the water really turbid? How would you describe it in words?

2. **Chlorophyll** is a measure of the pigment in plants and algae that collects the energy needed for photosynthesis. Measuring chlorophyll gives us an idea of how much plankton is in the river. We need to filter the water and "catch" all the particles in the water on a filter. After filtering 120 mls of water (2 syringes) look at the filter and match the filter color to the chart on the direction sheet. The number you record represents chlorophyll, as well as other plankton and particles in the river.

Time: \_\_\_\_\_ Color chart number best matching your sample \_\_\_\_\_

## DAY in the LIFE PUSH CORE SEDIMENT LOG

GRAB ID#	Site Name	DATE	FORM COMPLETED BY:		
			GROUP #		
TIME	LATITUDE	LONGITUDE	WATER DEPTH	LOCATION	
	Yes	No			Descriptors - Please note additional observations
H <sub>2</sub> S smell					H <sub>2</sub> S smells of rotten eggs, suggesting anaerobic bacteria
Oil					Oil creates a slight smell, a slickness and a sheen
Oxidized top*					*oxidation (reaction with oxygen) creates a distinctly lighter colored layer of sediment.
					estimate dimensions of oxidized layer, etc. and draw below
	Absent	Rare	Common	Abundant	Additional Comments
Clay					very fine material - grey color & rich dense feel
Mud					smooth feel between fingers - brown color
Sand					gritty feeling between fingers
Gravel					pea sized pieces of stone
Pebbles					pieces of stone larger than pea
Leaves					
Wood					
Shells Oysters (dead/alive?)					
Freshwater mussels (except zebra)					
Zebra mussels					
macroinvertebrates					
Brick					
Coal					
Slag					industrial byproduct - chunky look, light, air filled
Living vegetation:					
Length of Core:					Length of Oxidized core top (if present):
If Bagged - Number On Core Collection Bag					
Sketch of your core below with measurements for each section & total core (be sure to label the top and bottom):					
<--BOTTOM			TOP -->		