Piermont 5/22/15 - Margie's cell phone 845-729-8535

Split students into 3 different groups for AM rotations

ROTATION TIMES	Activity
9:00 at Lamont	Orientation & then Deployment to Pier
9:45-10:25	Rotation #1 – 1/3 group
10:35-11:15	Rotation #2 - 1/3 group
11:25-12:05	Rotation #3 - 1/3 group
12:00 –12:40	LUNCH
12:45-1:10	Rotation #4 – ½ group
1:20-2:00	Rotation #5 – ½ group
2:15 – 3:00	WRAP UP DISCUSSION

Name	Activity Description -	Helpers	Rotation Order
1 - Chemistry	Chemistry – (salinity, DO, temp, pH, alkalinity, nitrates, phosphates) & weather connections	Teacher /Other	Red Breasted Sunfish
2 - Coring	Coring & the story of the sediments	Margie	Blue Fish
3 – Tides & Turbidity	Tides/Currents/ Depth/Turbidity	Teacher/Other	Menhaden (Green)
4 – Sea Level Rise	Sea Level Rise	Teacher/Other	½ group
5 – Fish	Seining/Fish ID/ & Catch per unit effort	Margie	½ group

PLEASE BE SURE TO RETAIN THE MASTER RECORDING SHEET FOR EACH ROTATION SO THAT WE HAVE THE DATA TO DISCUSS

GOAL: Introduce students to doing ***field work*** - how collecting data in the field differs from working in the classroom or a lab. Building an understanding of the ***ecosystem in the brackish*** Piermont section of the river following a ***systems approach***. Careful collection of their ***own data***, which will be used as ***secondary data*** for others, so recording ***metadata*** is important.

FOCUS: The 'River That Flows Both Ways' is a ***dynamic environment.*** In this Hudson River program students will study the river system through the lens of a specific fish species that connects to the Piermont location in the river. At each station they will assess how the sample results connect to their specific fish. Each station builds into their understanding the full system.

OPERATIONS:

We have 26 students who will rotate as 3 groups in the AM. We have 3 AM stations and they will each do all three (labeled above). Our goal is to engage all of these students in the activity at each station, so if possible get them to run through the activities & tests. Coach them to run the activity and encourage them to think.

LOGISTICS:

IT IS IMPORTANT THAT AT THE END OF EACH ROTATION THE DATA BE POSTED/CHARTED!

Please be sure a student is assigned to post data in each group –on the post it board. Students will also record their own data. Collecting the data is key!

1. Each group will rotate through all stations following the same rotation so they will always go in the same order from whatever number they start at, as a counter clockwise rotation around the pier. If they start at station #1 they go to #2 etc. If they start at #3 they go to #1 etc. It is in a circle. The focus for each station should be **(1) What does this test tell us? (2) Why is this important for us to know? (3) What do the results mean to us i.e. what is it telling us about our fish species?**

2. **Thinking beyond the 'number'** – Each station has an observational component. They can jot down thoughts, observations, sketch etc. Try and get them to slow down a minute to develop observational skills. The data collected is more than a number – there are interactions, impacts etc. focus on. Encourage a dialogue on observations – i.e. what might be influencing what they see, what would be worth noting.

STATIONS:

1. Chemistry – see notes on Chemistry Sheet – the focus here is on how this station links to the rest of the river system – what impacts it and what does it impact. Salinity, DO and % saturation, pH are the big 3, nitrates, phosphates and alkalinity are supporting data

- **Weather, Site Description – metadata station:**

Focus on collecting & recording air temperature, wind & weather for the day and then for the last 2 days. Discuss how your chemistry data is affected by the weather present and

past. Emphasize that this data is extremely important to carefully collect to provide context for the other data – everything from chemistry to fish assemblages.

1. If you have time have them look and complete the physical description piece of the form and then ask them to spend 10 minutes sketching the at the end of the pier with color pencils trying to be as spatially accurate as possible. Include the chemistry sampling sites, where tides and currents are collecting data, plankton pump, blockhouse etc.
2. Record weather, wind etc. – discuss the strengths and weaknesses of Beaufort.
3. Record any other observations – wildlife noted, use of the river through large ship traffic etc.

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2. Coring & sediment story

- Coring – small push cores will be collected by each group.
  - Talk about what information we can gather from cores etc.
    - Discuss that it represents ***time.***
    - Remind them of the principle of ***superposition***.
    - Collect the cores and have them look to see if there are ***layers*** while it is in the sleeve, i***dentify top and bottom i.e. oldest and youngest sediment***.
    - Push it out onto the tray and have them ***measure it, smell it*** for anaerobic decomposition.
    - Cut the core in ***half*** and have them ***touch it to feel grain size*** etc., and ***describe it*** and complete their core/grab description sheet.
    - Discuss what can we learn from cores? Reinforce as you describe things that the sediments are a natural part of the weathering and breaking down of the rocks and plants by the Earth (detritus).
    - I suggest you keep samples for the day – useful in showing variation over the day and also in case don't get a core for one group you have one to look at.

• **The sediment story & other contributions** – If they have time they can do some beach combing - working with the core sample sheet the students will consider the story of the sediments in Piermont.

- They will collect materials along the shoreline – bits of coal, brick, slag, shells etc., items that have been moved by the river – to build the story of the sediments and environment at Piermont.

- They can also look for crab molt shells, crabs etc. If time allows would love to get at least one or two stories jotted down during the day

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3. Tides (include Depth), Currents, & Maps, Weather and other observations.

TIDAL INFORMATION for you but let the students determine this independently.
2014-10-16 11:03 AM EDT 0.97 feet Low Tide
2014-10-16 4:58 PM EDT 3.30 feet High Tide

• Tides – Begin by defining tides and currents –

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Tides are measured measuring down from the end of the pier. This can be tricky for them because as the tide rises the measurement gets smaller but this whole series of activitis develops critical thinking for them.

- **a.** Use a rope to measure at the end of the pier distance from the top of the pier to the surface of the water and record. Then lay this out on the pier surface to measure tidal height (from pier surface to water surface). Have them calculate rate of change from last reading. $\Delta H/T$
- **b.** Measure **depth** at end of pier (bottom to surface of water), record as depth measure (use weighted line and tape).
- **c.** Measure distance from bottom of water to top of pier - should be the same as **b** plus **c** (a verification)

• **Currents** measure at end of pier if possible - you will note ebb or flood & calculate speed to knots – You can use either of the following 2 methods to collect data on currents.

- Ask them to observe & ***predict*** which direction they think the current is flowing
- Then test it. Use multiple students for this – one tosses the orange, one runs the stop watch – starting it as soon as the orange hits the water, one lines up with the orange where it hits the water, one lines up with where it is when time stops and then others use the tape to measure etc.
  - **a.** Using 30 or 60 secs. as a preset time (the amount of time might need to be set after doing this once to see how quickly the current is moving) toss in the orange and see how far it travels in that time. Compute and record as **cms. per second.**
  - If their prediction did not hold up discuss why this might be true.

Turbidity - For turbidity the focus is to see what small items are living in the area –

- **Turbidity** - water clarity –discuss what components make up turbidity in the Hudson – positive (detritus, plankton, natural sediment flow, salt) and negative (anthropogenic increase in sedimentation rates, pollution/CSO) components. A major link is that the turbidity in the Hudson is a sign of the productivity. Discuss how lack of turbidity can be a negative – i.e. the impact of zebra mussels in the upper Hudson and how this reduces turbidity but is a negative component.
- Use two different measures (1) the **sight tube** and (2) the secchi disks – these are **semi-quantitative measures** that through repetitions, and adding more sets of student eyes can be averaged to develop a **more accurate measure**. NOTE: MUST LOOK STRAIGHT DOWN THE WATER COLUMN.
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4. Sea Level Rise Activity – Separate directions

5. Seining –

- Looking at ***abundance*** and ***diversity***. –
  - Students will ***seine, count and ID*** using Clearwater dichotomous key, and for each unique species ***measure largest*** caught in each seine. We

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will also set a ***trap*** and see if we catch anything in that as a different type to what is pulled up in the net. In order to get an accurate count it is useful not to put the fish back during the day. There are bubblers so you can ***hold onto the fish*** during the day to show other groups – they can sketch if you want.

- Not everyone is in the water so the back up group can help with ***mapping where the seine occurred.*** It would be great to keep a track of the seine …where and approximate length.
- Please keep track of the catch for each group. THIS TAKES WORK!!! There are sheets for each group in your folder. Please complete one for each group and have someone post on the board at the station.
- Would love to have them sketch some of the fish carefully!!! – This is a great way to help them with IDing. There will be paper in the folders for this.
- If time allows they can calculate ***CPUE*** using the formula on the sheet.

PULLING IT TOGETHER & WRAPPING UP: At ever rotation as the data gets posted it is a good way to look at what might have changed during the day or what has remained the same. Does this make sense? i.e. might this be an error in procedure or is the system really changing?

At the very end of the day we try and wrap up the whole day by doing a quick look at the data so if you can have the post it boards come back at the end of the day to the end of the pier so we can talk about how their fish would have survived in the environment.

DEPARTURE:
We will clean up and head back to LDEO.

Please clean up supplies after finishing your last tests…

THE SNAPSHOT DAY WEBSITE HAS LOTS OF INFORMATION
http://www.ldeo.columbia.edu/edy/k12/snapshotday/