

What do you need? CLOSED TOED SHOES!!, Bag lunch, Comfortable clothes- we will be in various vans and buses and a boat but you may have to walk around a bit, It might be smelly- look out. Journal,

Day 3

Start Time & Location:

8:30 am Masonville Cove Environmental Center, 1000 Frankfurst Avenue, Baltimore, MD 21226

3:00 Wheelabrator Baltimore RESCO, 1801 Annapolis Road, Baltimore, MD 21230

- **Evidence, Artifacts, Investigations**
- **Canoeing! Green Building! Trash to Energy!**
- What are the water quality issues on the Patapsco and Chesapeake? Can anything live in there?
- We will collect water quality data.
- Where do things go when we throw the "Away"? Can we make the city a happier, healthier more sustainable place?
- We will visit the plant that burns most of Baltimore garbage.
- Gain a better understanding of urban sanitation issues and sustainability issues in Charm City

What do you need? Shoes that can get wet: Chacos, Tevas, old tennis shoes, sandals. FLIP Flops are not appropriate. Comfortable clothes to be outside all day, A bag lunch, water bottle, Journal, maybe a hat, Canoeing the headwaters of the Patapsco!!

Day 4:

Start Time & Location:

9:30 Cylburn Arboretum 4915 Greenspring Avenue Baltimore, Maryland 21209

- **Evidence, Artifacts, Investigations**
- We will tour a sustainability project- Aquaponics
- Meet with an expert on urban tree planting
- In the afternoon we will visit the Arboretum and go for a walk

next to West end

What do you need: Bag lunch, comfortable clothes, water bottle, journal,

Day 5:

Start Time & Location:

8:00 Canton Waterfront Park, 3001 Boston Street, Baltimore, MD 21224

- **Evidence, Artifacts, Investigations**
- How can we make it better? Is there hope?
- We will cruise around on a work boat and dredge for oysters and trawl for fish. We will take another look at water chemistry on a new level. Finally we can make some conclusions about the Patapsco, Chesapeake, and the watershed.

Form and Present Conclusions- what's the next step?

What do you need? Comfortable clothes and shoes, bag lunch, journal, water bottle,

Over the course of the week, there will be distinct day trips investigating a separate, yet related, section of the Patapsco River watershed. The duration of each day will depend on the activity; however, we aim to begin at 8:30 or 9 am and be done with the day by 5 pm at the latest. Please come prepared for outdoor activities each day by checking for weather conditions, dressing appropriately, and bringing your own lunch and something to drink.

Water Quality Data Worksheet

1. Choose 1 of the 28 Reserves to study. *Railroad Station Patuxant Below Belt.*

2. What are the current meteorological and water quality conditions at your NERR?

Air temperature (°C)	<i>Raw No data</i>	<i>Jug Bay 23.4 C</i>
Pressure (mb)	<i>no data</i>	<i>1,015 mb</i>
Rainfall (mm)	<i>no data</i>	
Water temp (°C)	<i>27.6 C</i>	
Dissolved Oxygen [concentration]	<i>5.5 mg/L.</i>	
Dissolved Oxygen (% saturation)	<i>70%</i>	
Salinity (ppt)	<i>0.2 ppt</i>	
Chlorophyll-a (if available)	<i>25 ug/L</i>	
Turbidity (NTU)	<i>3 NTU</i>	
pH	<i>7.1</i>	
Other		

* 1 mb a lot or NOT

3. What is the highest and lowest temperatures (°C) recorded for 2014 at your Reserve?

	Date
Reserve	
Hi	
Lo	

4. What is the highest and lowest DO [concentration] at your Reserve in 2014?

	Date
Reserve	
Hi	
Lo	

5. Is there a correlation between the high/low temperatures and high/low [DO]? Why do you think is it?



HOW DO WE STUDY CHANGES IN THE CHESAPEAKE BAY AND THE BROADER ENVIRONMENT AND WHAT DO THE CHANGES MEAN?

Let's go deeper.

What is underneath the marsh. What is the soil made up of?

Why do we need a buffer? Why is the marsh important?

Field Experience Rubric

How can we monitor the Bay for evidence of change impact? climate change signs.

What tools/resources?

Types of Data?

What systems can we investigate?

1. Investigative question (supporting questions)
 - a. Question *Does the marsh change from shoreline to the interior?*
 - b. Why is this investigation relevant and to whom (think about your audience)
2. Background Research *Relevant to students who want to go in depth @ marsh. Explore it.*
 - a. What information already exists and is closely related to investigative question (data, scientific articles, web resources, etc.) *Shoreline Zones Marsh Migration*
 - b. what prior knowledge do you need to make investigation successful *Why*
3. Methods *Seeing site Express*
 - a. monitoring protocols and tools *Core Sampler transect line*
 - b. define study site/location *Cemetery Beach Sandy Shoreline Trees Different Zones*
 - c. safety concerns *BUGS TICKS DEHYDRATION STAYING TOGETHER*
4. Investigation Plan
 - a. Procedures *All these differences*
 - b. Data collection/observation tools/methods
 - i. how will data be collected and organized, **DATA**
 1. water quality *soil samples*
 2. photos ✓
 3. elevation
 4. etc. *identification*
 - ii. ideas for how you are going to use the data *build a marsh understand composition*
 - c. Potential Challenges and mitigation strategies *test to see water go through it.*
5. Conduct field Investigation ✓
6. Process data and observations
 - a. organize data
 - b. manipulate, analyze, summarize and graph/display data to communicate your findings (prezi, ppt., meme, voki, www.kahoot.it, tellagami, <https://plot.ly>)
7. Communicated and apply findings
 - a. Claims, Evidence, Reasoning
 - i. **Claim:** A statement that answers a scientific question
 - ii. **Evidence:** Scientific data that supports a claim
 - iii. **Reasoning:** The logic that connects the evidence and the claim, and principles from what is already known that explain why it makes sense
 - b. Suggestions for improvements and modifications if this happens again
 - c. Other questions that came up during the investigation
 - d. Applications in the "real world"

yes Soil Composition changes along with vegetation.

This makes sense because we know there are a variety of habitats @ island.

the planning and carrying out the investigation

Do soil & vegetation change from high tide mark to 250 feet to the interior of Cemetery

What is a Marsh?

How does it change from

Top Layer ① Transection

Hula Hoop

② ~~Hoop~~ Photo (Flags)

Coastal Flat ③ Pans

Record Data
Each area
Each layer

low Marsh

Mid Marsh

High Marsh

Surface - Camera

Core Sample data

Pans

Identify
Photograph

What

1. How does marsh soil & vegetation change ~~based~~ from NW side of shore line to highest elevation point.

side of imagery SMT core Marsh Tube health Pans

Shoreline HT

Highest Elevation

EQUIPMENT
Data

How Does soil composition change in concurrence with noted vegetation?
on Cemetary Beach?

Data and the Estuary 2015, Agenda

August 3-7, 2015

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Pre-Course Assignment (available on tockify -)

- Disappearing Islands of the Chesapeake Bay
- Know your School Grounds and Watershed
- Planning and carrying out investigations: an entry to learning and to teacher professional development around NGSS science and engineering practices.

MONDAY 8.3.15

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Supporting Questions:

- How can you monitor the Chesapeake Bay for evidence of change/impact?
- What tools and resources can we use to monitor the environment?
- What types of Data can we collect?
- What systems can we investigate?

7:30 Depart DNR

10:00 Arrive KNC

- Meet and greet

10:15 Board Boat – Set Crab Pots

Introduce organizing question

Set Crab pots - KNC

11:30 In Depth Intros. And orientation to KNC

12:00 Lunch

1:00 Intro to workshop

Workshop goals and outcomes

Parking lot

Organizing and supporting questions

Agenda

Systems approach

Scientific Process

How to Develop Driving Questions

3:00 Smith Island introduction -- KNC staff

Develop questions/discussion points for Smith Island interview Panel

5:30 Application Session - Eco ID Tree

6:30 DINNER

8:00 Application Session

Tuesday 8.4.15

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Supporting Questions:

How can you monitor the Chesapeake bay for evidence of change/impact?

What questions and issues are the natural resource community monitoring or asking

What tools and resources do science professionals use to monitor the environment?

What types of Data are collected?

7:00 Breakfast/Intro into day

8:45 Board boat -- Professional Research Project Case Study - Smith Island /Holland Island

Holland Island: Holland Island (if time, tides and weather are good)

PROGGING OPTION

12:00 Lunch on Smith Island

Panel discussion with residents from Smith Island/USFWS on changes to the island as shaped by the Bay, and how to plan for ecological/community resiliency

2:15 Cross Curricular conversation -- Vicki Matthews

4:15 Prep for Dinner (get cleaned up and on the boat (bring your wallet)

5:00 Depart for Dinner out at Red Rooster + Journal time -- on the boat en route to restaurant

Discuss: what are some other important topics being researched around/on the bay?

6:00 DINNER

9:00 End

WEDNESDAY 8.5.15

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Supporting Questions:

How can you monitor the Chesapeake bay for evidence of change/impact?

What tools and resources can we use to monitor the environment?

What types of Data can we collect?

What systems can we investigate?

7:00 Wake up

7:30 Breakfast

8:00 Bio Blitz - Intro To the Day

12:00 LUNCH

12:30 Work on presentations

How will you prepare data and report it out?

How could you use the days activities or info in your class?

4:00 Get Crabs: Catch some dinner

5:00 Dinner

7:00 Application/journal Session – Next Generation Science Standards

How can NGSS fit with workshop content

What is on the horizon for NGSS

Reflections on NGSS

8:00 Fish Print Time? OR Work on Lesson Seeds/Unit Plans

10:00 End

THURSDAY 8.6.15

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Supporting Questions:

What do these changes/monitoring results mean for the CB ecosystems?

How can we respond to these changes in the ecosystem?

7:00 Breakfast

8:00 Depart for Horn Point Labs

9:00 Application Session – Tools for building science understanding

Demonstrate and train the teachers in use of related online tools:

- About Est. 101 - web tour
- SWMP Data
- CBIBS Salinity in the Bay
- About Ches Ex
- Ches Ex. - Dissolved Oxygen
- Ches. Ex. - Habitat Requirements
- Fieldscope - Sea Level Rise (SLR Viewer)

12:00 Lunch

12:30 Tour of HPL -- Oyster Restoration

1:30 Work on Lesson Seeds

4:30 Depart HPL/Return to KNC

7:00 Dinner

8:00 Bio Blitz presentations

10:00 End

FRIDAY 8.7.15

Driving Question: *How do we study changes in the Chesapeake Bay and the broader environment and what do the changes mean?*

Supporting Questions:

- How do we connect students to the Bay and broader environment so that they are aware of the changes and willing to affect those changes.
- What is the Role of EXPERIENTIAL LEARNING - Sunrise Experience - Opportunities for Experience at Schools

6:00 Sunrise Trip to Bloodworth Island

7:30 Breakfast

9:30 Discuss Unit Plans as a group

10:30 Evaluations on Site + Clean up KNC

11: 30 Wrap up

12:00 Depart/Or Lunch