



Teachers on the Estuary



August 1 – 5, 2016

Chesapeake Bay National Estuarine Research Reserve - Maryland

Chesapeake Bay Foundation

NOAA Cooperative Oxford Labs



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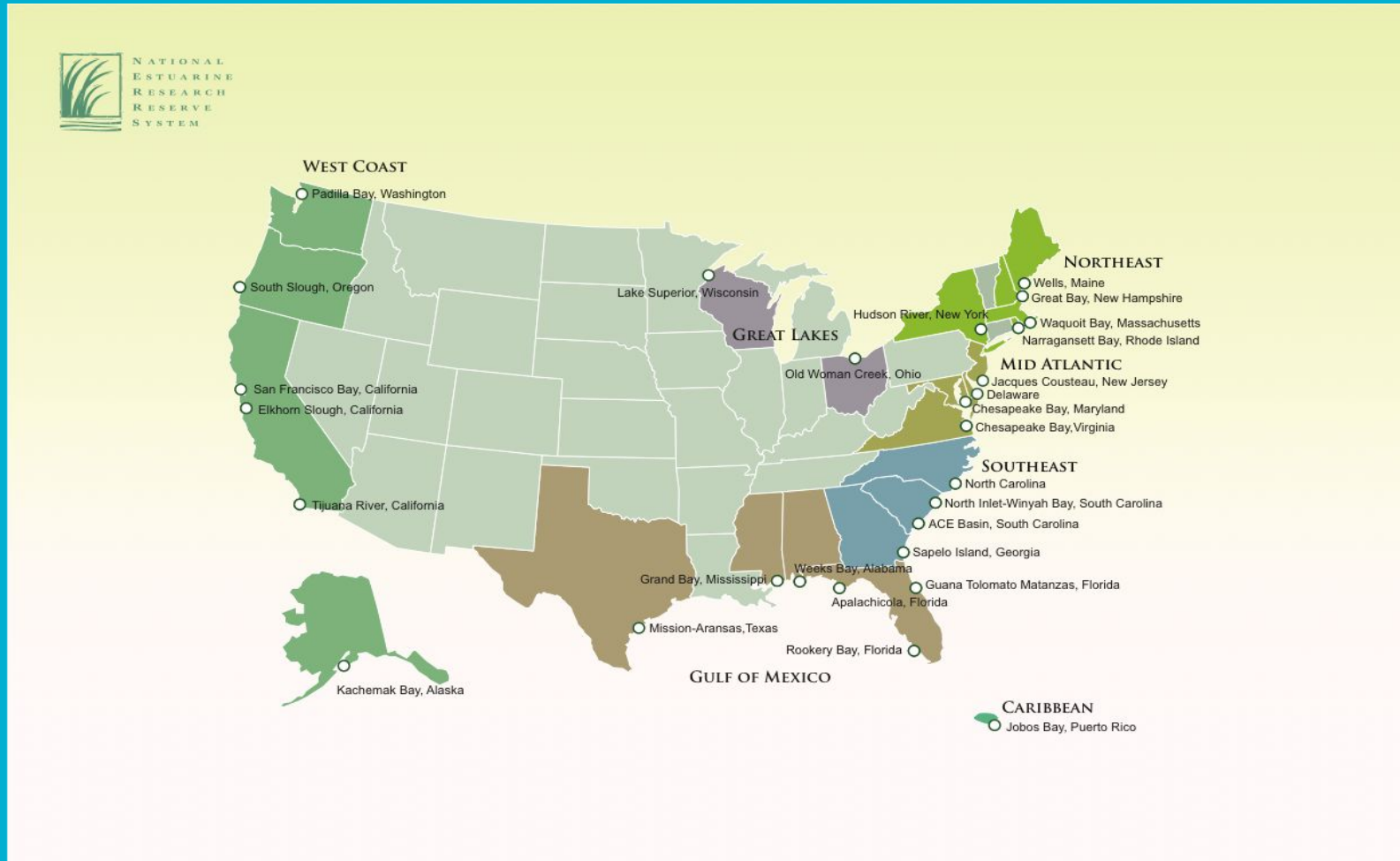
Teachers on the Estuary



YOU!



Chesapeake Bay National Estuarine Research Reserve- Maryland

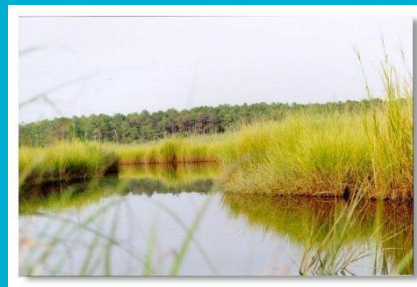


Part of a national program 28 NERRs nationwide



CBNERR-MD Mission

To inspire and empower stewards of Maryland's natural places by studying, teaching and connecting people to estuaries.



National Oceanic & Atmospheric Administration

- **Mission**

*...To understand and predict changes in Earth's environment and conserve and manage coastal and marine **resources**...*

***Science, Service,
Stewardship***



NOAA is Huge!



**National Ocean
Service**



**Environmental
Satellites**



**National Weather
Service**



Marine Fisheries

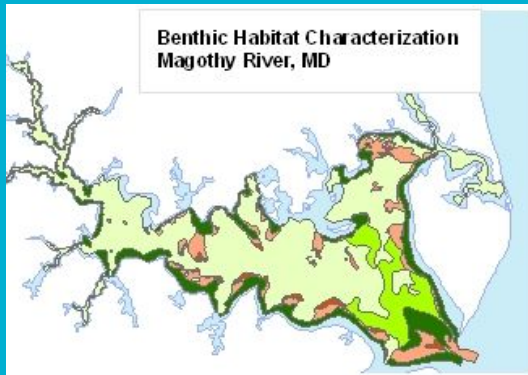


Oceanic and Atmospheric Research

NOAA Chesapeake Bay Office

Science

- Habitat Characterization and Assessment
- Buoys and Remote Coastal Observations
- Fisheries and Ecosystem Modeling



Service

- Oyster Restoration
- Interjurisdictional Fisheries Management Coordination
- Applied Fisheries Research



Stewardship

- Communication and Training
- Systemic, School-Based Science Education
- Environmental Literacy Policy Coordination





Chesapeake Bay Foundation

MISSION AND VISION

The Chesapeake Bay Foundation's (CBF) mission is to Save the Bay, and keep it saved, as defined by reaching a 70 on CBF's Health Index.

Our vision is that the Chesapeake Bay and its tributary rivers, broadly recognized as a national treasure, will be highly productive and in good health as measured by established water quality standards. The result will be clear water, free of impacts from toxic contaminants, and with healthy oxygen levels. Natural filters on both the land and in the water will provide resilience to the entire Chesapeake Bay system and serve as valuable habitat for both terrestrial and aquatic life.



Vicki Mathew

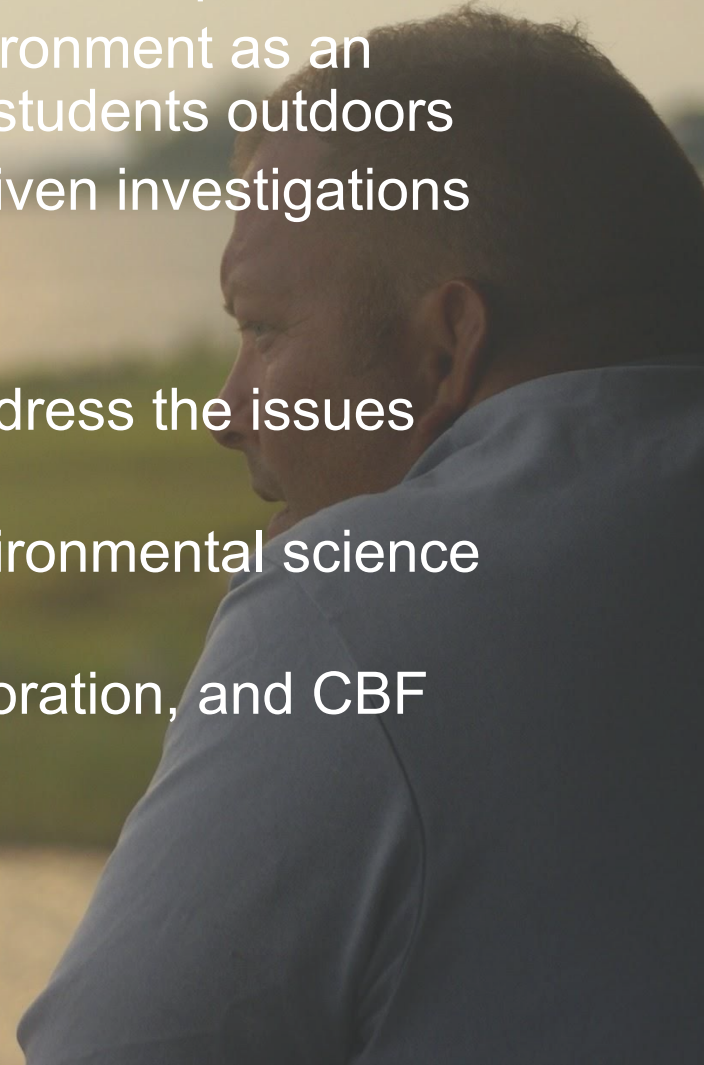
- Afya Public Charter School
- Mentor Teacher Leadership Role
- The Mentor Teacher Program provides:
 - **sustained support** to teachers participants
 - **expertise** and **practical advice** on **integrating environmental literacy** into the K-12 curriculum
 - **valuable feedback** on program quality and development.



Teacher Professional Development

Teachers on the Estuary Goals

- Knowledge of Meaningful Watershed Education Experiences
- Support teacher comfort in utilizing the environment as an integrated context for learning, and getting students outdoors
- Design and implement authentic student-driven investigations connected to Bay issues
- Analyze and interpret collected information
- Consider action projects to manage and address the issues based on results of investigations
- Access tools and curricula that support environmental science programming
- Introduce Estuaries 101, Chesapeake Exploration, and CBF Environmental Literacy Model



New Chesapeake Bay Agreement



Chesapeake Bay Program
Science. Restoration. Partnership.

- **Goal: Enable every student in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed.**

Meaningful Watershed Education Experience

A Guide to Creating Meaningful Watershed Experiences



How to provide meaningful outdoor experiences for your students as mandated by the Chesapeake Bay Program Chesapeake 2000 Agreement

What is a MWEE?



What is a MWEE?

MWEEs seek to seamlessly connect standards-based classroom learning with outdoor field investigations to create a deeper understanding of the natural environment.

- Issue Definition
- Outdoor field experiences
- Action Projects
- Synthesis and conclusions

Environmental Literacy Graduation Requirement

Purpose

The purpose of Maryland's Environmental Education program is to enable students to **make decisions** and **take actions** that create and maintain an optimal relationship between themselves and the environment, and to **preserve and protect** the unique natural resources of Maryland, particularly those of the Chesapeake Bay and its watershed.

In Focus: Environmental Literacy

COMAR Regulation 13A.03.02

Beginning with students entering high school in 2011—2012, all students must complete a locally designed high school program of environmental literacy as set forth in COMAR 13A.04.17 that is approved by the State Superintendent of Schools.

Program Resources

- **Environmental Literacy Standards**
- **Common Qualities of Effective Environmental Education Programs**
- **Environmental Education Toolkit**
- **Maryland State Environmental Literacy Curriculum**
- **Environmental Literacy LEA Planning Survey**
- **Environmental Literacy Curricular Infusion by Grade Band**



Commonwealth of Virginia
Office of the Governor

Executive Order

NUMBER FORTY TWO (2015)

ESTABLISHING THE VIRGINIA ENVIRONMENTAL LITERACY CHALLENGE

Importance of the Issue

Virginia's natural resources and its environment are among the Commonwealth's most important assets. Our fields, forests, streams, and rivers help to grow food, and ensure that we have clean air and water. The Virginia Constitution details our responsibility to conserve and protect these resources, saying in part, "To the end that the people have clean air, pure water, and the use and enjoyment for recreation of adequate public lands, waters, and other natural resources, it shall be the policy of the Commonwealth to conserve, develop, and utilize its natural resources, its public lands, and its historical sites and buildings."



Environmental Literacy in VA

- Governor's Environmental Literacy Challenge
 - Conservation Classroom Challenge
 - School Division Challenge
- Department of Conservation and Recreation - Virginia Naturally

<http://www.dgif.virginia.gov/education/conservation-challenge/>

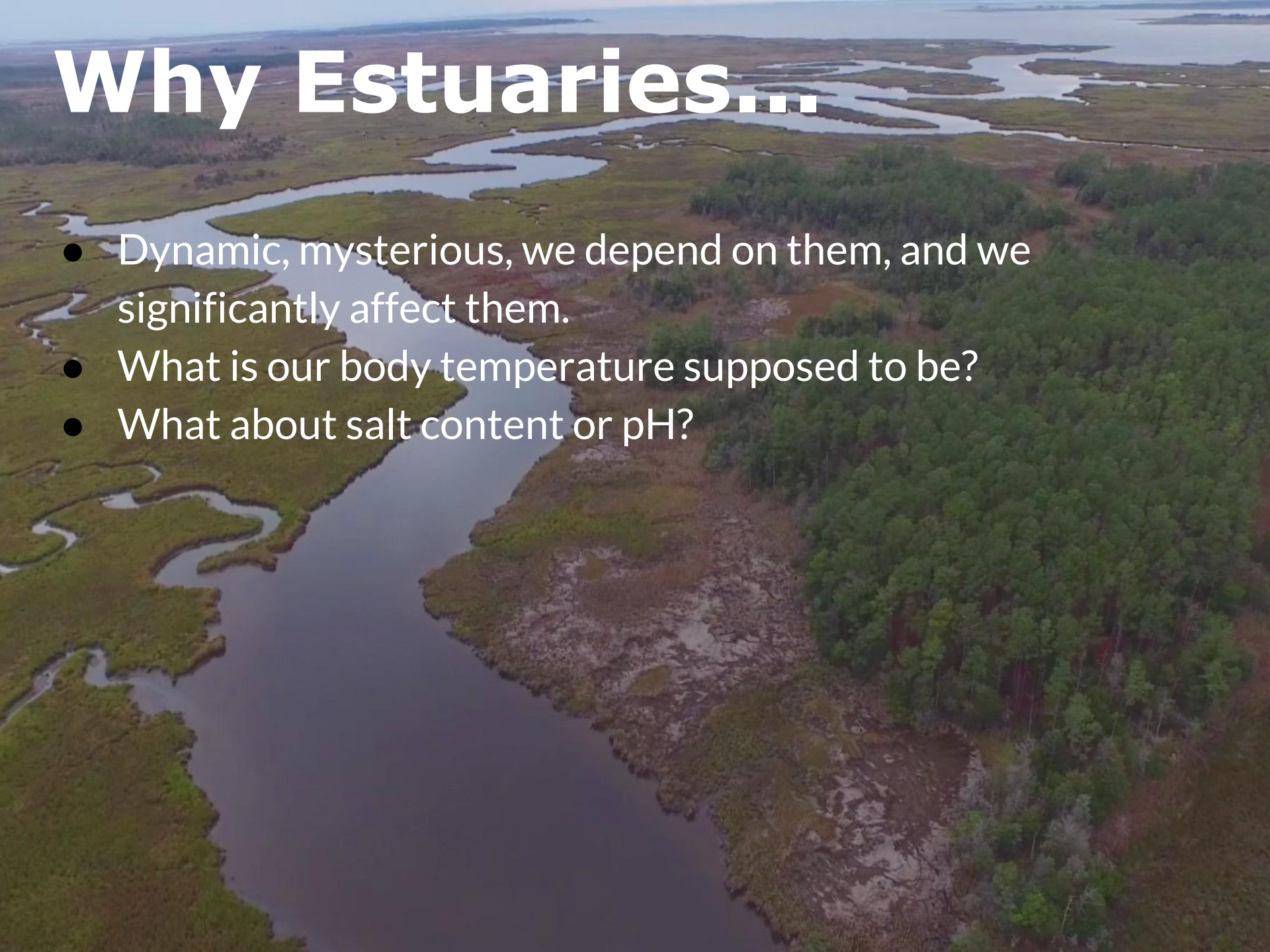
An Estuary is:

Where rivers meet the sea

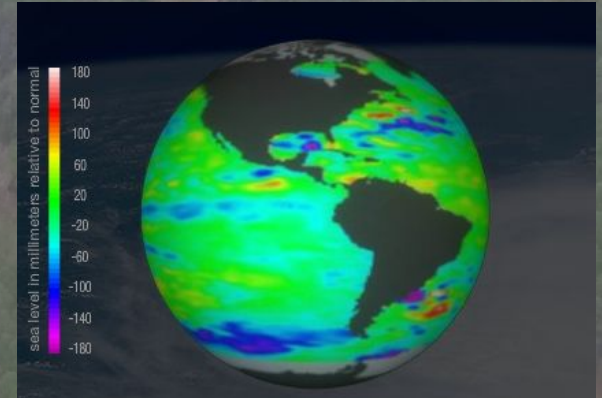
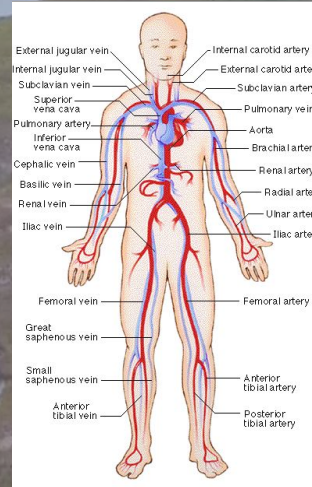
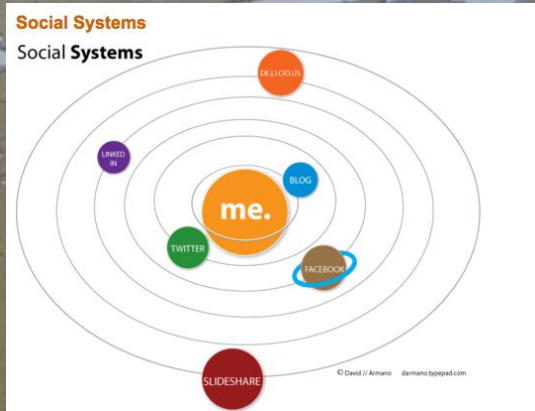


Why Estuaries...

- Dynamic, mysterious, we depend on them, and we significantly affect them.
- What is our body temperature supposed to be?
- What about salt content or pH?



Systems Thinking

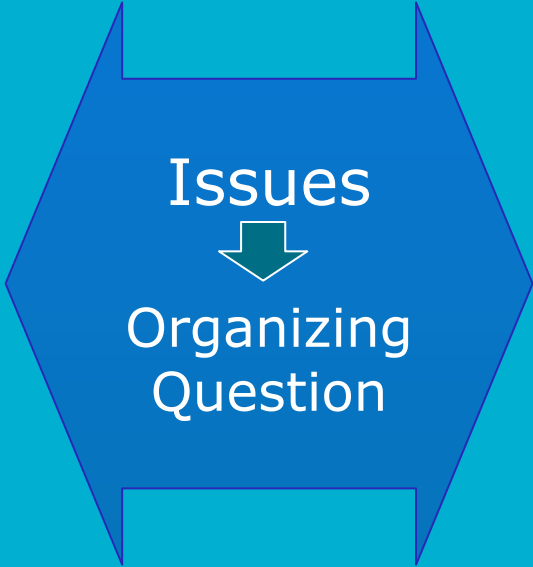


- Look at the whole picture, not just focusing on the parts
- Systems Thinking – the ability to understand (and sometimes predict) interactions and relationships in complex, dynamic systems: the kinds of systems we are surrounded by and embedded in. – Kruschwitz, Lyneis, And Stuntz, *Schools that Learn*
- Systems Thinking - provides learners with a more effective way of interpreting the complexities of the world around them.

How the course is organized



Natural Systems



Issues
↓
Organizing
Question



Social Systems

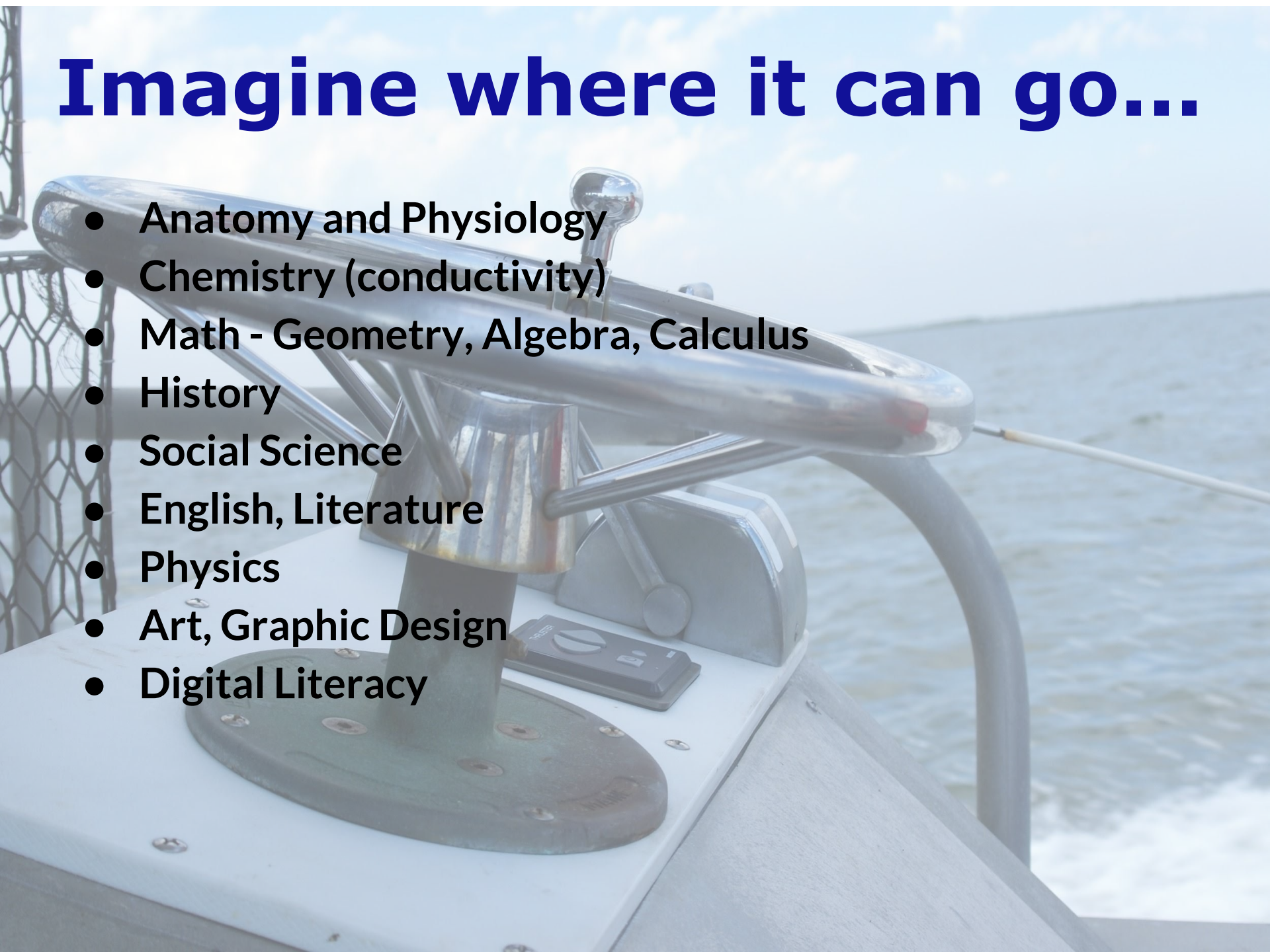
What do we consider...

- Getting students beyond their classroom
- Making observations
- Using tools that are relevant to them
- Relating it to their own environments
- Inquiring further
- Involving “real” data... word problems become reality



Imagine where it can go...

- Anatomy and Physiology
- Chemistry (conductivity)
- Math - Geometry, Algebra, Calculus
- History
- Social Science
- English, Literature
- Physics
- Art, Graphic Design
- Digital Literacy



Science Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information



A FRAMEWORK FOR K-12 SCIENCE EDUCATION

Practices, Crosscutting Concepts, and Core Ideas

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Science Standard Learning for Virginia Public Schools



Board of Education
Commonwealth of Virginia

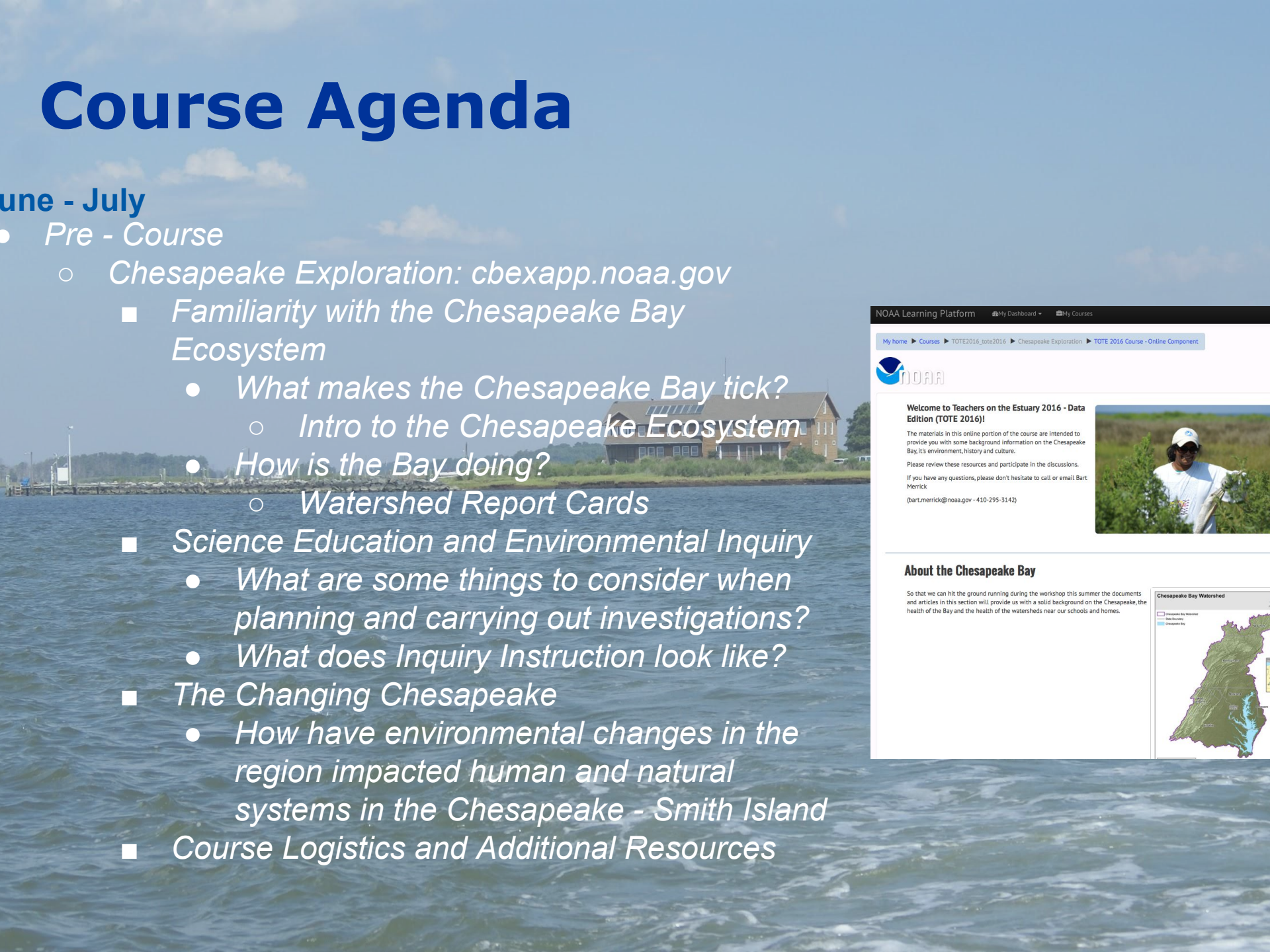
January 2010

Course Agenda

June - July

Pre - Course

- Chesapeake Exploration: cbexapp.noaa.gov
 - Familiarity with the Chesapeake Bay Ecosystem
 - What makes the Chesapeake Bay tick?
 - Intro to the Chesapeake Ecosystem
 - How is the Bay doing?
 - Watershed Report Cards
 - Science Education and Environmental Inquiry
 - What are some things to consider when planning and carrying out investigations?
 - What does Inquiry Instruction look like?
 - The Changing Chesapeake
 - How have environmental changes in the region impacted human and natural systems in the Chesapeake - Smith Island
 - Course Logistics and Additional Resources



NOAA Learning Platform [My Dashboard](#) [My Courses](#)

[My home](#) ▶ [Courses](#) ▶ [TOTE2016_tote2016](#) ▶ [Chesapeake Exploration](#) ▶ [TOTE 2016 Course - Online Component](#)

 NOAA

Welcome to Teachers on the Estuary 2016 - Data Edition (TOTE 2016)!

The materials in this online portion of the course are intended to provide you with some background information on the Chesapeake Bay, its environment, history and culture.

Please review these resources and participate in the discussions.

If you have any questions, please don't hesitate to call or email: Bart Merrick
(bart.merrick@noaa.gov - 410-295-3142)



About the Chesapeake Bay

So that we can hit the ground running during the workshop this summer the documents and articles in this section will provide us with a solid background on the Chesapeake, the health of the Bay and the health of the watersheds near our schools and homes.

Chesapeake Bay Watershed



Course Agenda

Monday: In the marshes, on the beaches and in the Bay

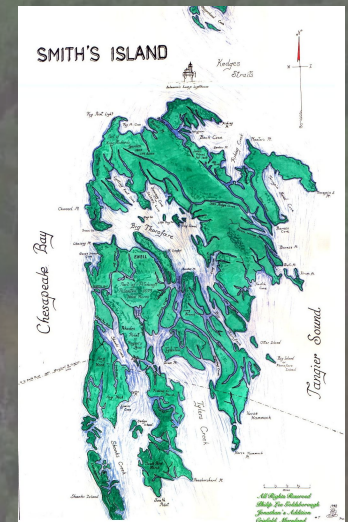
- *Travel to Bishops Head (Karen Noonan Center)*
 - Arrive by 10:00 AM (Carpool from Annapolis leaves at 7:30AM)
- *Driving Question: How do we study changes in the Chesapeake bay and the broader environment and what do they changes mean?*
 - Investigative Question: How can you monitor the Chesapeake 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?

Course Agenda

Tuesday: On the Bay – Values and Community Resiliency - How is science used in decision making

Investigative Questions:

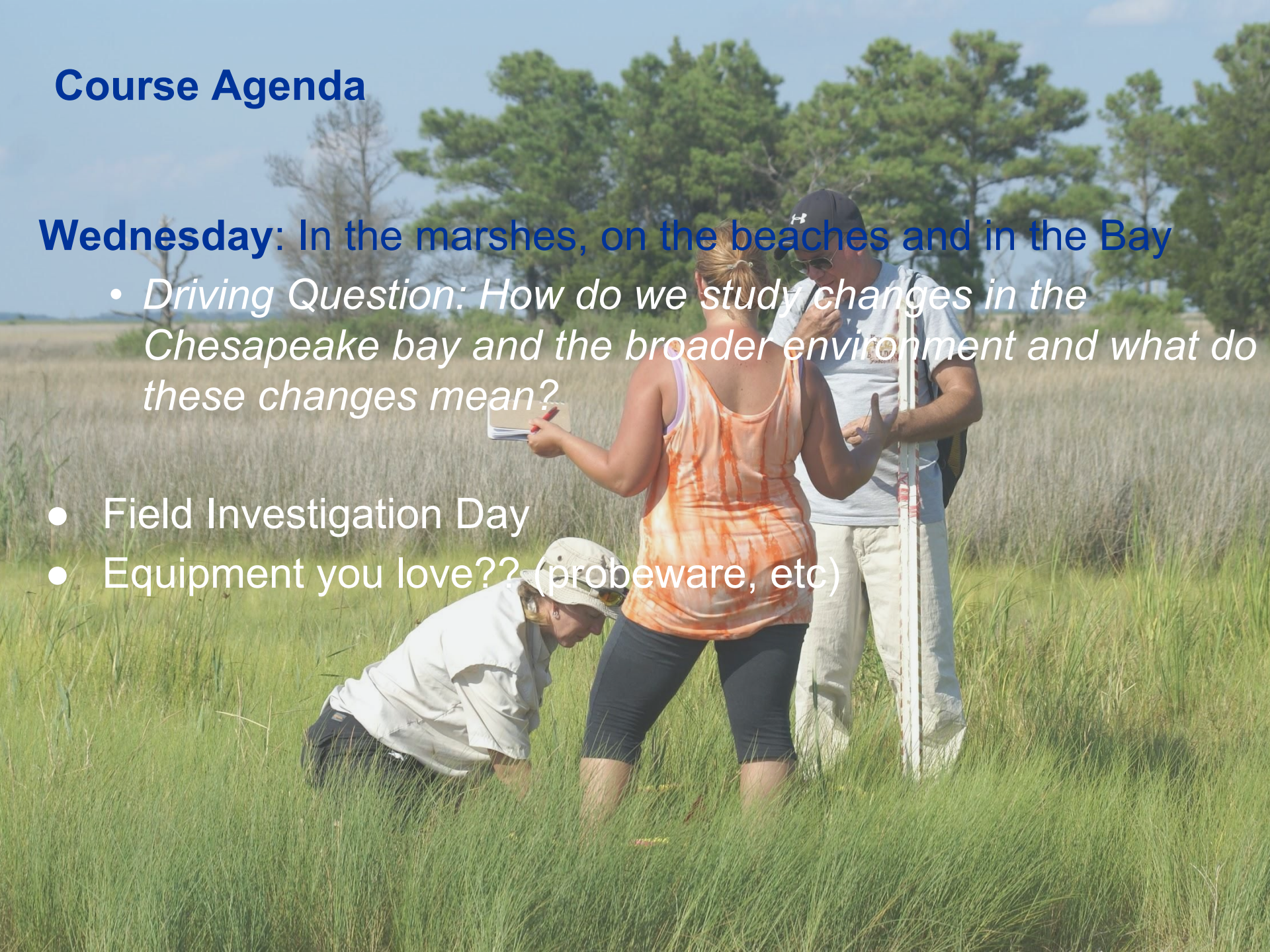
- What questions and issues are the natural resources community monitoring and asking that can help communities prepare for environmental change?
- What tools and resources do science professionals use to monitor the environment?
- What types of data are collected?
- *Prepare for a long day on the boat!!*



Course Agenda

Wednesday: In the marshes, on the beaches and in the Bay

- *Driving Question: How do we study changes in the Chesapeake bay and the broader environment and what do these changes mean?*
- Field Investigation Day
- Equipment you love?? (probeware, etc)



Course Agenda

Thursday: Horn Point Lab – University of MD

Investigative Questions:

- What are some additional sources of environmental data and how we access them?
- What do these changes/monitoring results mean for Chesapeake ecosystems?
- How can we respond to these changes in the ecosystem?
 - *Tools for building science understanding*
 - *Science on the Bay – Tour of Horn Point*
- ***Bring a Laptop***

Course Agenda

Friday: wrap up and departure

Investigative Questions:

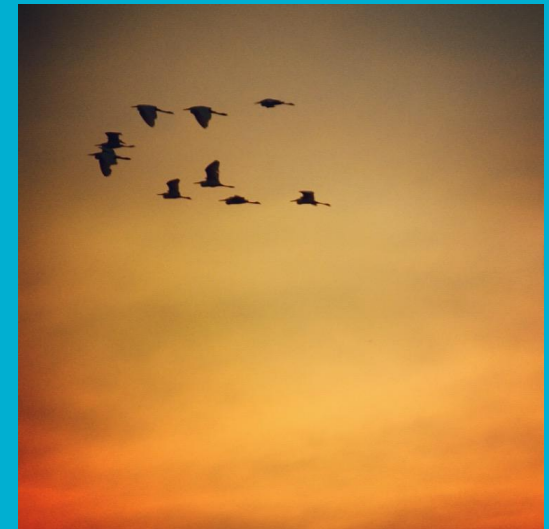
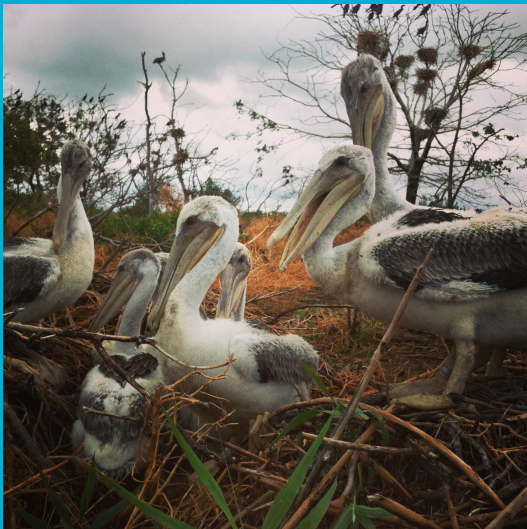
- **How do we study changes in the Chesapeake bay and the broader environment and what do these changes mean?**
 - **How do we connect students to the Bay and broader environment so that they are aware of the changes and willing to affect those changes?**
 - **What is the role of EXPERIENTIAL LEARNING – Sunrise experience – opportunities for experience at schools**

After the workshop

Submit /Final Project

Course Requirements

- Participation
 - 45 contact hours (includes orientation session)
 - Active participation in all aspects of the course including group activities, discussions, and reading assignments
- Create and submit (to Sharepoint) a Curriculum Integration Project
- Completion of a course journal to record assignments, professional reflection, data collection and reading notes (optional)

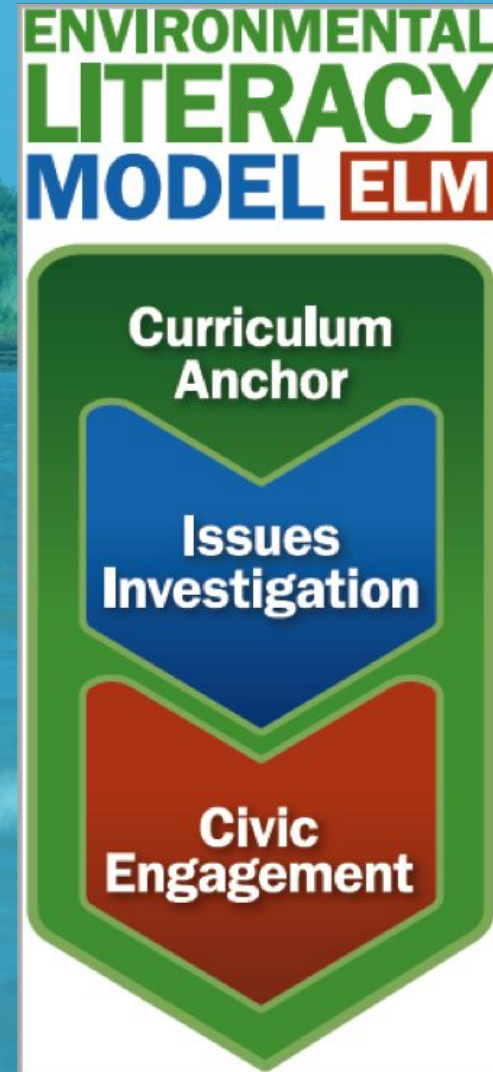
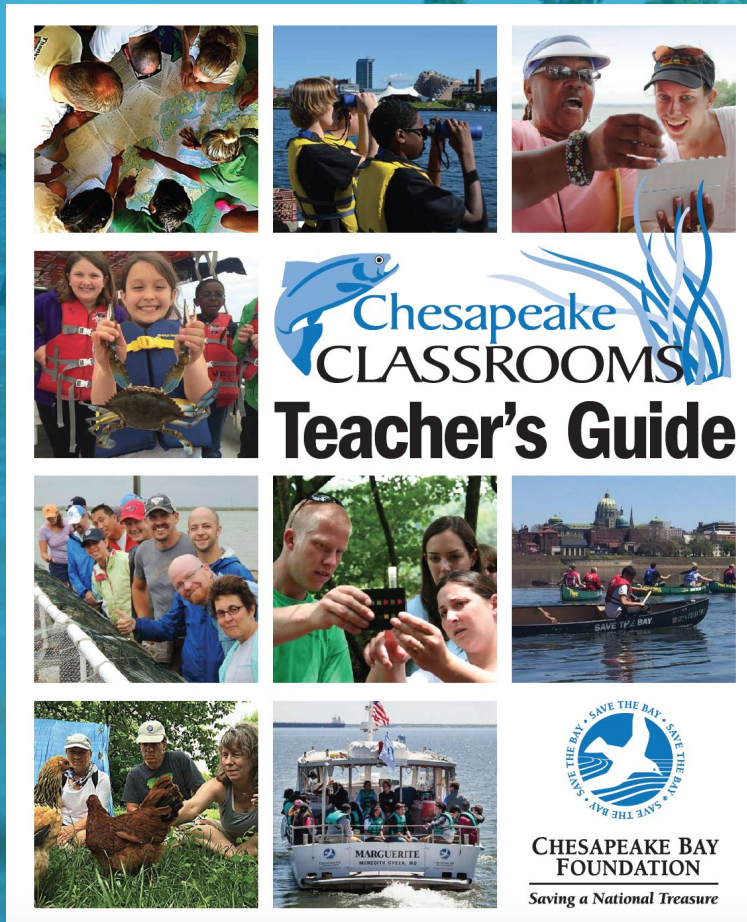


Course Requirements

Meaningful Watershed Education Experience CURRICULUM INTEGRATION PROJECT

- Curriculum Integration Project must include:
 - Curriculum Anchor -- an outline for the plan to integrate what was learned here into what is already in the curriculum
 - Chesapeake Bay Issues Investigation component
 - Civic Engagement Plan
- CIP DUE (posted to Share Point) by September 1st

Resources



Course Credit

Maryland: 3 MSDE Credits

Virginia: Documentation of 45 Contact Hours

Graduate Credit (3):

- A three to five page reflection of the experience. The paper should include your personal reflections on the field experience and your thoughts on applying the course to your classroom teaching.
- Completion of a course journal to record assignments, professional reflection, data collection and reading notes (optional – though helps with the reflection piece required)
- Active participation in the five-day field experience, includes group activities, discussions, and reading assignments
- Completion of ELM Curriculum Integration Project
- Additional Registration and \$714 fee to Mary Baldwin College
- For more information, go to www.mbc.edu/ebf

Logistics - The facility

- everyone is required to submit a CBF Health form--email to Claire ccambardella@cbf.org prior to the start of the course if you have dietary restrictions or health issues we should be aware of
- bring a laptop!- we will use this when we visit Horn Point Lab
- go over the packing list thoroughly--closed toed shoes are required for all activities, and loose, long layers are ideal for bug and sun protection
- we may have time for art- bring an extra t-shirt for fish printing!

Logistics – Share Point

Share Point – Upload Curriculum Integration Plan, view other plans, access resources, photo sharing

To access Share Point

- Go to: cbforg.sharepoint.com/education/chesapeakeclassrooms
- You will be emailed a username and password to log on

To upload Curriculum Integration Plan

- See instruction in Teacher Guide

The screenshot shows a web browser displaying the Chesapeake Classrooms SharePoint site. The address bar shows the URL: https://cbforg.sharepoint.com/education/chesapeakeclassrooms/_layouts/15/start.aspx#/. The page has a blue header with 'Office 365' and 'Sites' tabs. Below the header, there's a navigation bar with links to 'Chesapeake Classrooms', 'Mentor Teacher Program', and 'MELP - Maryland Environmental Literacy Partnership'. The main content area features a welcome message: 'Welcome Chesapeake Classrooms Teachers!' and a photo of a group of people on a boat. To the right, there's an announcement: 'Upload your Final Project by Sept 1st'. A left sidebar contains a list of links: 'Home', 'Course Information and Projects - Upload Here', 'MELP', 'MELP Courses and Projects', 'Announcements', 'Mentor Teacher Program', 'Credit Information', 'CBF Contacts', 'Course Photos', 'Lesson Examples', 'Resources', 'Helpful Hints & FAQ', and 'Recycle Bin'. The bottom of the page shows a taskbar with various application icons and a system clock indicating 8:37 AM on 5/24/2016.

Questions?



Contact Information

- **Bart Merrick: Bart.Merrick@NOAA.gov**
 - ***Office: 410-295-3142***
 - ***Cell: 410-963-2841***
- **Claire Cambardella (CBF staff): ccambardella@cbf.org**
 - ***KNC Land Line: 410-397-8014***
 - ***Cell: 443-205-2321***
- **Coreen Weilminster Coreen.weilminster@maryland.gov**
 - ***Office: 410-260-8744***
 - ***Cell: 202-369-4772***
- **Vicki Mathew**
 - ***Email: ysmathew@gmail.com***
 - ***443-554-8447***
- **Karen Noonan Center (For emergencies during course)**
 - ***410-397-8014***
- **Chesapeake Bay Foundation**
 - ***410-268-8816***