

Teacher At Sea – Lesson Plan #1

Carol Glor – 2014
Sea Scallop Survey – 3rd Leg

Activity Title: Overview of Sea Scallop Survey

Subject (Focus/Topic): Home & Career Skills students will learn about the importance of protecting the Sea Scallop supply.

Grade Level: 8th grade

Average Learning Time: 1 (40 minute) class period

Lesson Summary: Students will be able to explain the importance of conducting a yearly Sea Scallop Survey in the Northwest Atlantic Ocean.

Overall Concept: Why do marine scientists survey the population of Sea Scallops in the Northwest Atlantic Ocean? How do scientists collect data during a Sea Scallop survey?

Specific Concepts: Students will learn about the history of marine science research in Woods Hole, Massachusetts. We will discuss the ocean as a food source as well as a source of employment for fishermen as well as those that provide materials and equipment for working at sea. Students will learn about the process of conducting a Sea Scallop Survey as well as the experiences that I had as a Teacher at Sea. They will understand the differences between the HabCam method of surveying as well as the dredging operations aboard the research vessel. Students will also select 5 careers from a list of marine careers that they would like to explore in more detail during a future class period.

Focus Questions:

- When did scientists begin studying marine life in the United States?
- Why do scientists conduct a yearly Sea Scallop Survey?
- Where is the supply of Sea Scallops most abundant?
- How does a HabCam work?
- What is the process of dredging?
- What kind of species are found on the ocean floor of the Northwest Atlantic Ocean?
- What careers are available that relate to marine science?

Objectives/Learning Goals:

- The student will ask questions related to the Powerpoint presentation.
- Given a list of 30 NOAA careers, the student will discover at least 5 marine careers that they are interested in exploring further.

Background Information: This is an introductory lesson. Students should have been exposed to marine science in seventh grade science lessons.

Common Misconceptions/Preconceptions: Students may assume that the topic of the lesson refers to a limited time period that I experienced and not potential careers that they might be interested in pursuing. They also might assume that as a Home & Career Skills teacher; I might not have the experience or skill to teach them about science. Many students do not understand how much of the coastal population of the United States relies on the fishing industry for income, tourism and food.

Materials:

- Teacher at Sea – Powerpoint presentation
- Youtube.com video links:
 - Surveying Scallops on the R/V Hugh R. Sharp
 - HabCam – Life on the Northwestern Seafloor
- NOAA Careers checklist

Technical Requirements:

- Teacher workstation that includes a computer with internet access as well as projection equipment

Teacher Preparation: In order to teach this lesson effectively, the teacher must thoroughly understand the NOAA Teacher at Sea program as well as being able to navigate the NOAA websites. Knowledge in marine science careers would be helpful as well as an understanding of the ocean as a habitat for marine life and human life support.

Keywords:

- HabCam
- Dredge
- Annotation

Pre-assessment Strategy: Not necessary for this lesson

Lesson Procedure:

- Use the Teacher at Sea Powerpoint presentation to give an overview of my adventure.
- At the conclusion of the last slide (how to shuck a scallop – video) show the following youtube videos:
 - Surveying Scallops on the R/V Hugh R. Sharp
 - HabCam – Life on the Northwestern Atlantic Seafloor
- Distribute the NOAA Careers checklist for students to indicate which careers they are most interested in. This will be collected and evaluated for a future career information activity.

Assessment and Evaluation: A formative assessment includes a brief question and answer session conducted throughout the presentation as needed to check for understanding. Future lessons related to this topic require a basic understanding of the keywords listed above. Students will also complete the NOAA Careers checklist and rate the 5 careers in order of interest. The teacher will collect all of the checklists and pair students according to their common interests. Students will be assigned a NOAA career to research according to their responses.

Standards:

- National Science Education Standards Addressed:

- Next Generation Science Standards:
 - Science and Engineering Practices
 - Analyzing and interpreting data
 - Engaging in argument from evidence
 - Obtaining, evaluating and communicating information
 - Asking questions and defining problems
 - Disciplinary core ideas
 - ESS3 – Earth and Space Science 3
- Ocean Literacy Principles Addressed:
 - 5 – The ocean supports a great diversity of life and ecosystems.
 - 6 – The ocean and humans are inextricably interconnected.
- New York State Science Standards Addressed:
 - MST standard 4
- New York State Family and Consumer Science Standards Addressed:
 - Standard 3 – Resource Management
- National Family and Consumer Science Standards Addressed:
 - 1 – Career, community & family connections
 - 8 – Food production & services
- Common Core Career Technical Core
 - Career ready practices
 - 5 – Consider the environmental, social and economic impacts of decisions
 - 7 – Employ valid and reliable research strategies
 - Career technical core
 - Agriculture, Food & Natural Resources Cluster
 - Science, Technology, Engineering & Mathematics Career Cluster

Additional Resources:

- <http://oceanexplorer.noaa.gov/edu/oceanage/>

Author: Carol Glor

Camillus Middle School
 5525 Ike Dixon Rd.
 Camillus, NY 13031
cglor@westgenesee.org

Creation Date: September 2014

NOAA Careers

Name: _____ Period: _____

Below is a list of some careers available through the National Oceanic and Atmospheric Administration. Read each description and select 5 that interest you the most.

| | | | |
|--|----|--------------------------------|---|
| | 1 | Assistant Professor | studies the chemistry of volcanic rocks to learn how explosive a volcano is, how old it is, how deep the lava came from, and what that lava encountered on its way to the surface |
| | 2 | Associate Professor | hydrothermal vents and how volcanoes support life in the absence of sunlight |
| | 3 | Associate Scientist | marine biologist who studies the ecological and evolution of communities that live on the ocean floor |
| | 4 | Biologist | uses chemistry to understand food webs in the ocean |
| | 5 | Chief Electronics Technician | make sure all the electronics equipment that is non-propulsion or engineering department-related is in working order |
| | 6 | Commanding Officer | responsible for the safety of the ship and all personnel embarked upon her |
| | 7 | Deep-Sea Biologist | studies deep-sea corals and deep-sea whale falls |
| | 8 | Director of Coral Conservation | research into various aspects of deep-sea biology, with an emphasis on deep corals |
| | 9 | Director of Education | oversee the programs that the Museum offers to students, teachers, and the general public |
| | 10 | Engine Utility man | maintenance, repair, and operations of the engine of a ship |
| | 11 | Fish Ecologist | collect data in the form of underwater photography and video in order to better understand how habitat influences the distribution and abundance of fishes |
| | 12 | Geophysicist | works with seafloor maps and images to analyze the processes that create undersea features such as submarine volcanoes |
| | 13 | Marine Ecologist | collect and identify deep-sea corals in North American waters |
| | 14 | Marine Geoarchaeologist | collect core samples to help reconstruct |

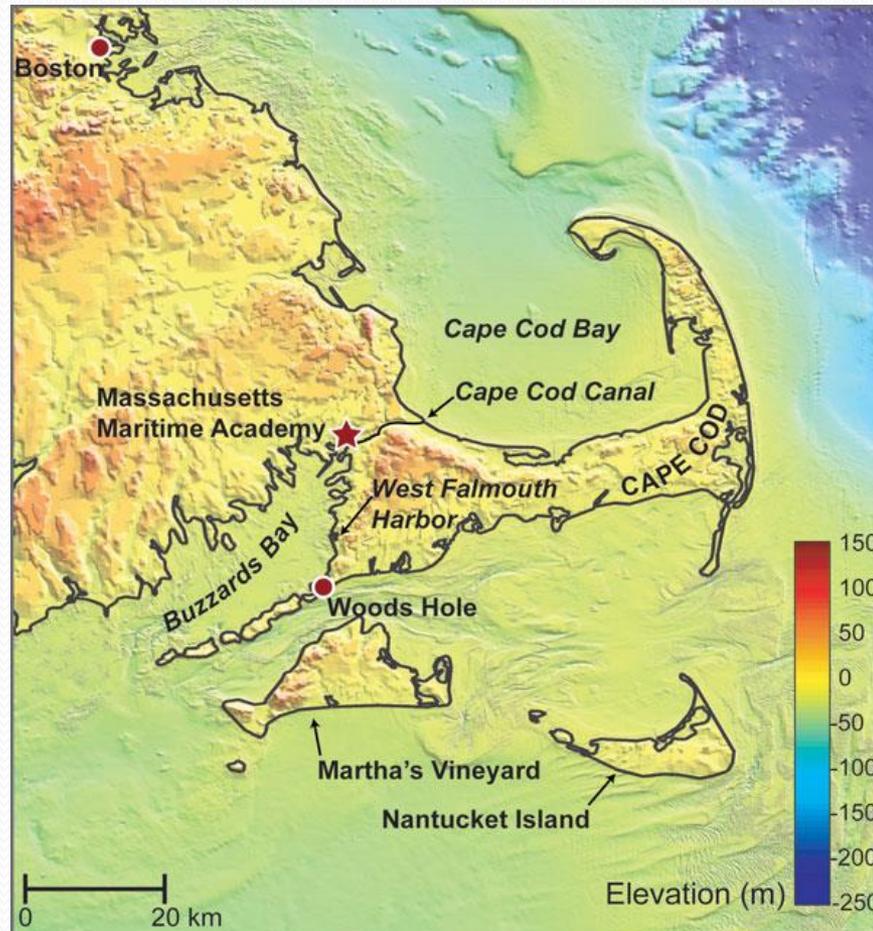
| | | | |
|--|----|--------------------------------|--|
| | | | what the environment of a place looked like in the past |
| | 15 | Marine Mammal Biologist | study the interactions between whales, seals and sea otters and their environment |
| | 16 | Marine Taxonomist | mission coordinator for biomedical research |
| | 17 | Maritime Archaeologist | direct the research program for the museum and the day-to-day operations |
| | 18 | Microbiologist | build a baseline of scientific information from which we can measure the processes and deterioration of <i>Titanic</i> |
| | 19 | Natural Products Biologist | Collect samples of marine plants and animals to use in drug manufacturing and disease research |
| | 20 | NOAA Corps Officer | helps facilitate research and gets to experience all sorts of ocean science discoveries |
| | 21 | NOAA Marine Scientist/Educator | share the excitement of these expeditions with the public through various direct and indirect outreach and education efforts |
| | 22 | NOAA Physical Scientist | providing the data and information required for effective ecosystem-based management through the exploration of marine and coastal areas |
| | 23 | Oceanographer | understanding of the world around us, awareness of conservation issues, increasing our use of advanced technology |
| | 24 | Principal Research Scientist | develop specialized lights and filters so that sport and science divers can see and photograph fluorescence |
| | 25 | Research Microbiologist | who studies the microbes found on corals |
| | 26 | Research Professor | writing grant proposals and searching for funds to complete research projects at sea |
| | 27 | Senior Engineering Scientist | developed multi-ping processing schemes and geometry based algorithms to enhance sonar imagery |
| | 28 | Senior Scientist | using submersibles to study marine life |
| | 29 | Submersible Pilot | effectively maintain the complex electronic systems aboard the submersible |
| | 30 | Underwater Filmmaker | exploring the mysteries of the ocean and giving the rest of us a glimpse into the previously unknown |

Teacher at Sea

Northwest Atlantic Ocean

July 6 – 12, 2014

Woods Hole, Massachusetts



NOAA's Northeast Fisheries Science Center

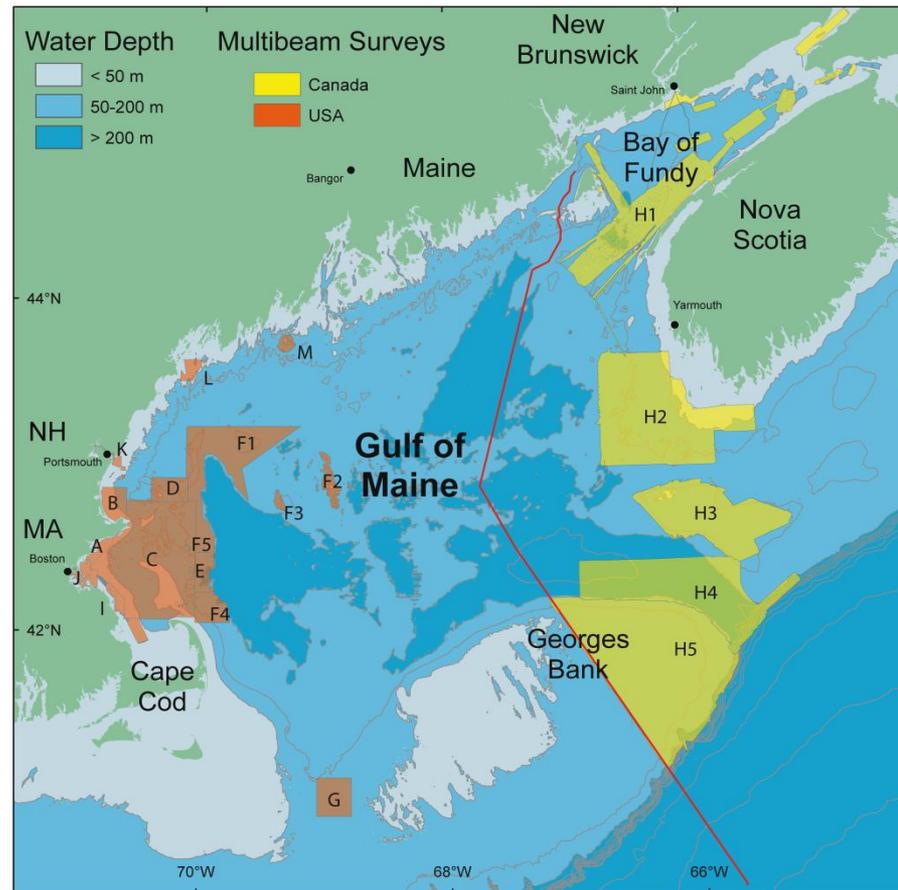
- Started the Woods Hole scientific community in 1871



3rd Leg of the Scallop Survey

- The scallop survey has been an annual event since 1977.
- Began as a bottom dredging event between May and July in the scallop-rich area of the Northwest Atlantic shoals known as Georges Bank.
- NOAA collects data to be shared with the Northeast Fisheries Association (NFA).
- NFA determines which areas are “open” or “closed” based on the analysis of the data.

Cruise to Georges Bank



R/V Hugh R. Sharp



Hoist the flag for departure



Life at sea



Dolphins at Play



The Wet Lab



Fin-Back Whale Sighting



Foggy days on Georges Bank



The elusive scallop



HabCam-ing



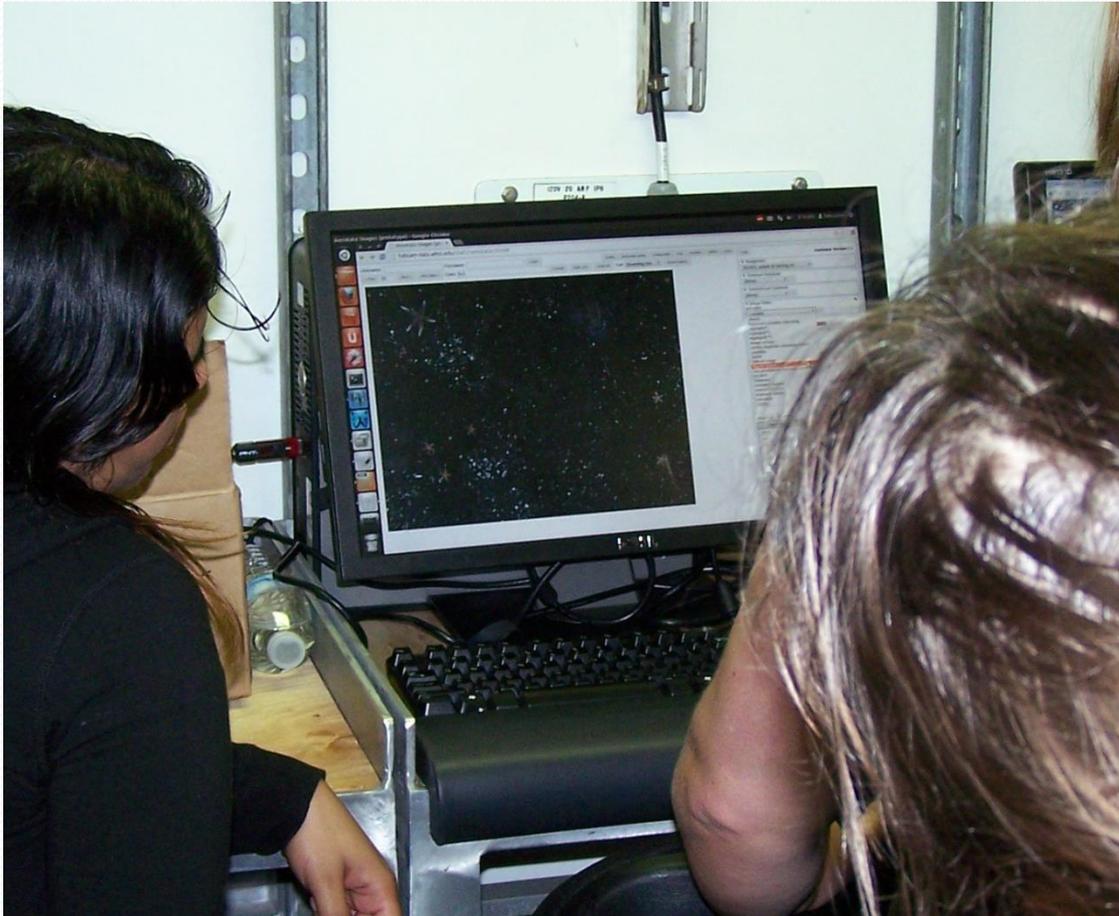
Survey Map



HabCam images



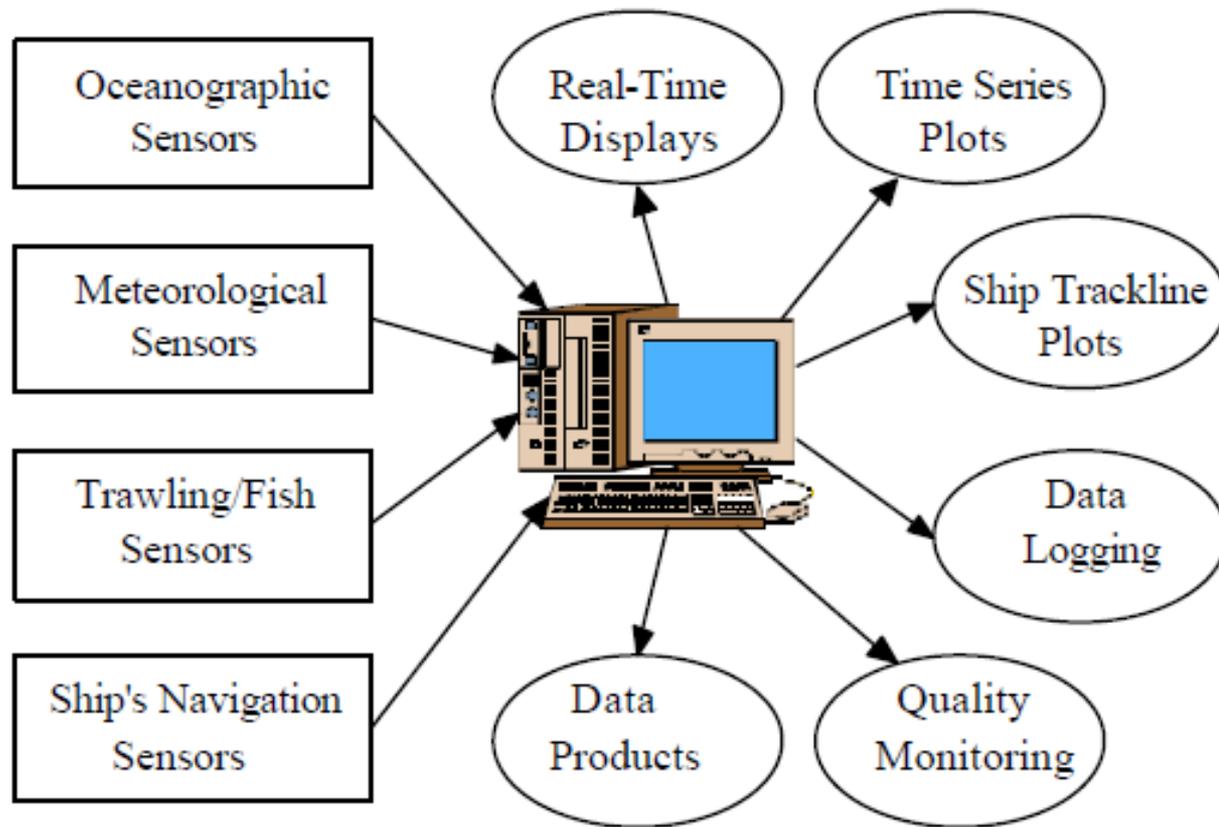
Annotating



Dredging

1. Program the dredge computer chip
2. Set up the dredge event on the computer
3. Install computer chip in the dredge handle
4. Begin the event in SCS (scientific computer system)
5. Radio the engineer on the bridge to lower the dredge to a precalculated line depth
6. Dredge is lowered to the ocean floor with added line slack
7. Dredge is towed for 15 minutes
8. Radio bridge to haul back the dredge
9. End the event in SCS
10. When dredge is safely on the table, remove the computer chip and record event data
11. Gear up to sort the catch

SCS at work



Let the games begin

<http://www.youtube.com/watch?v=Wwtiy3cDeYM&list=UUT5nrMDIbIV5sPwRcuTmygm>



Sorting the catch



Nature's bounty and "trash"



Recording species data



Time for a shuck-fest



Dredging bycatch





How to shuck a scallop