

Biological Sampling Device Using a Sea Perch

Overview

This lesson is to be used as an extension activity with the Sea Perch. It is designed to utilize the Sea Perch to study the Aquatic Food chain. Scientists use ROVs like the Sea Perch to study the health of aquatic environments.

Grades: 11th – 12th

Time

1 day construction/test

1 day collection

Up to a week for microscope analysis/identification

Objective

The students will:

- Construct plankton nets to be towed by the Sea Perch.
- Modify their Sea Perch to tow the plankton net.
- Collect specimens to be examined and analyzed in the classroom.

Skills Attained

- Develop research skills by collection and analyzing an aquatic sample
- Manipulate Sea Perch for biological sampling
- Construct sampling device
- Write lab reports
- Interpret, identify, and analyze samples
- Team data collection

National Science Education Standards

Content Standard A - Science as an Inquiry

- Ability necessary to do scientific inquiry
- Crosses disciplines and grade levels

Content Standard C – Life Science

- Interdependence of organisms
- Matter, energy, and organization in living systems

Content Standard E – Science and Technology

- Abilities of technological design

Content Standard F – Science in Personal and Social Perspectives

- Population growth
- Environmental growth
- Natural and human induced hazards

Content Standard G – History and Nature of Science

- Science as a human endeavor

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Lesson

Plankton is the collective term used to describe the smallest animals and plants in the sea. It is a vast and diverse group with approximately 10,000 species. They are called plankton because they all have similar lifestyles:

- Most exist in the top 30 meters of the sea in an area scientists call the ‘photic zone’.
- Most are incapable of free swimming and drift on the ocean currents.

The word plankton comes from a Greek word, which means ‘to wander’. They are found at all depths and are comprised of both plant (phytoplankton) and animal (zooplankton) forms. Plankton are important as indicators of the health of our oceans as they are the primary producers of the ocean. They are also a key factor in climate change. Plant plankton (phytoplankton) produces ~50% of the total photosynthesis of plants on Earth, sucking the greenhouse gas carbon dioxide (CO₂) from the atmosphere.

In the marine environment climate and weather patterns affect the rate of photosynthesis, and therefore the primary production in that area of the sea. There are distinct differences between the seasonal cycles in temperate Atlantic waters and tropical seas. This distinction is based on thermoclines.

By collecting samples of plankton along with the temperature of your sample site, you can assess the health of the aquatic environment, which impacts the local fish and shellfish population. Marine biologists and ecologists are constantly monitoring plankton levels at critical areas of the ocean to determine global climate change and its impact on our ocean resources (commercial fishing, etc).

Materials

Sea Perch

Plankton Net

8 in embroidery hoop – plastic

Gatorade bottle

Zip ties

Panty hose

Harness

Braided Dacron line – 60 lb test

—” PVC T’s

—” PVC, 2 feet

Safety Tips

Don’t fall in water

PFD

Common Sense

Don’t drink water

Procedure

1. Dry demo of sea perch/warm up
2. Discussion of aquatic food chain
3. Create a food chain for the body of water you are going to test

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4. Modify Sea Perch to tow plankton net – be careful to not let the net get caught in the propellers
5. Biological Collection
6. Microscope ID

Assessment

- Test on plankton identification
- Written reports and/or presentations

Resources

Plankton of Narragansett Bay

Plankton ID web sites

- <http://www.lighthouse.chtr.k12.ma.us/plankton/intro.htm>
- <http://www.earthwindow.com/zoo.html>
- http://www.intandem.com/NewPrideSite/Asia/Lesson7/Lesson7_3.html

Possible Interdisciplinary Connections

English – lab reports

Art – drawing of specimens and illustration of food chain

Technology – power point

Display student work