Plankton Parents

Overview
This series of three labs challenges students to think about the role of plankton in different ecosystems and waterways in the world. By modeling the research methods of scientists on the Healy icebreaker, students can conduct a small-scale change study to examine reproductive behavior of an isolated type of local plankton.

Objectives
- Students will learn what plankton is and what its ecological significance is in various ecosystems.
- Students will demonstrate the use of scientific observation skills in identifying the difference between male and female plankton in a water sample.
- Students will isolate and study a sample specimen.
- Students will be able to record and share findings.

Lesson Preparation
Collect a live water sample from a local waterway during a time of year where plankton density is high. Choose a type of plankton that you will focus on and prepare picture cards of this and 5-6 other types of plankton. Gather supplies and set up microscopes. Establish a lab supply table for students to collect materials. Review multimedia and reading materials.

Procedure
Day One: Plankton?
1. Give students picture cards of various types of zooplankton. Challenge students to try to identify what kinds of organisms they are looking at. Discuss: Which features told you what they were? What body parts did you notice first? Are these all the same kind of living thing? What are some of the similarities and differences?
2. Show students slides of plankton studies in the Bering Sea. "Catching Calanus" How are samples gathered? What role does plankton play in the ecosystem? Guide

Materials

Day one:
- Water sample containing plankton from local waterway
- Picture cards of zooplankton
- Power Point: "Catching Calanus" (download)
- Student microscopes
- Internet access

Day two:
- Internet access
- PolarTREC 'Live from IPY' Archive (See Resources section for link)
- Live plankton samples
- Student microscopes
- Petri dishes or other small, clear plastic dishes
- Eyedroppers

Day three:
- Picture of plankton eggs
- Student microscopes

discussion of plankton in the Bering Sea to plankton in your local watershed. What is the purpose of the plankton in the ecosystem? What do they need to survive?

3. Examine water samples under microscopes. Have students search for a specific common type of plankton that is prevalent in the sample. Have students record sketches of plankton in their science journals.

4. Have students share their journal entries and strategies for recording observations.

5. Partner reading: Read online journal entry about catching Calanus on the Healy icebreaker and/or view slides of plankton collection on the expedition: polartrec.com/node/9750.

Day Two: Catching plankton
1. Review material covered in Day One. Discuss records and sightings.
2. How do you study plankton on the Healy? View the PolarTREC 'Live from IPY' event archive: http://www.polartrec.com/archives/9924
3. Introduce reproduction study. Objective: How many eggs do plankton from our local waterway lay in 24 hours?
4. Identify what a female looks like. Compare to male sample.
5. Demonstrate method for catching plankton in eye-droppers while looking through the microscope.
6. Demonstrate filling Petri dishes with one female in each dish.
7. Each student should "catch" one female plankton. Place her in a dish and then fill out the lab report based on this specimen.
8. Share findings.

Day Three: What happened?
1. Review lab from previous day. Make predictions as to what may or may not be found in sampling dishes.
2. View a picture of what eggs look like from the specific plankton that you are studying. Discuss shape and form and significance of both in terms of survival.
3. Gather lab supplies.
4. Use microscopes to look for the presence of eggs.
5. Students should record findings in lab journals
6. Share findings on a class chart that demonstrates the ratio of egg-layers to non egg-layers. Discuss: How many eggs were in each? What does this mean when we look at the role of plankton in an ecosystem? What does this tell us about reproduction in a population?

Extensions
- Plan a class trip to a local waterway where students can come into contact with a body of water containing plankton.
- Examine samples of different types of plankton. Compare physical forms.
- Use scientific key to identify different plankton samples.
- Create a dichotomous key to identify different types of plankton studied.

Resources

PolarTREC 'Live from IPY' event archive. This Live from IPY event was held with PolarTREC Teacher Simone Welch and numerous researchers working on the USCGC Healy in the Bering Sea as part of the Bering Sea Integrated Ecosystem Research Project.
http://www.polartrec.com/archives/9924

Assessment

Students should demonstrate understanding of subject material through lab reports and discussion.

Credits

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National Science Education Standards (NSES):

Content Standards K-4

Content Standard A: Science as Inquiry
a.   abilities necessary to do scientific inquiry
b.   understandings about scientific inquiry

Content Standard C: Life Science
a.   characteristics of organisms
c.   organisms and environments

Content Standards 5-8

Content Standard A: Science as Inquiry
a.   abilities necessary to do scientific inquiry
b.   understandings about scientific inquiry

Content Standard C: Life Science
a.   structure and function in living systems
b.   reproduction and heredity
c.   relugation and behavior
d.   populations and ecosystems

Other Standards:
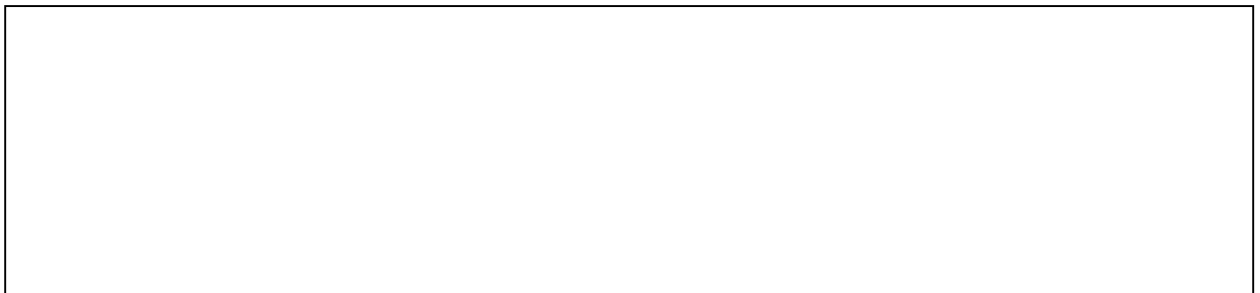N/A

Name: Date:

Lab: Pickin' Plankton

1. Collect your water sample from the supply table.
2. Look closely. What do you see? Can you identify the specific type of
        plankton that we are looking for? Record the name of this species
        and draw a picture of any examples that you identify in the box
        below. Include as many details as possible.

Species Name: _____

3. Record any differences that you notice between individual organisms.

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Additional observations: