Who Ate my Lunch?

Subject Areas: Science, Language Arts
Setting: Classroom
Duration: One Classroom Period
Skills: Research, critical thinking, writing, listening, deciding,
Vocabulary: Food web, food chain, predator, prey, producer, consumer, energy, organisms above plus, green and blue crab, cow nose ray, moon snail, oyster drill, gull, adaptation

Correlation to Core Curriculum Standards:
Science: 5.1 (A,B), 5.2 (A), 5.10 (A,B);
Language Arts: 3.1(G,H), 3.2 (A,B,C,D), 3.3 (A,B,C,D), 3.4 (A,B), 3.5 (A,B,C);
Math: 4.1(A,B), 4.5 (A,C,E)
Life Skills: 9.2 (A)

Objectives:
1. Understand the concept of food webs
2. List shellfish species and predators in the Barnegat Bay
3. Use listening and critical thinking skills to solve ecology questions
4. Perform follow up research and report on information learned

Materials: Barnegat Bay Field Guide, or other graphics, a bag of candies/cookies (plain M&Ms or vanilla wafers), paper plates, Barnegat Bay Field guide, and access to other sources of learning about bay organisms, worksheets.

Background: The bay is habitat for many different organisms. In nature, there are chains and webs that show the relationships between these organisms based on predator and prey relationships. In reality, they are very complex, and depend on the stage of life each organism is in, as well as environmental conditions.
However, to learn about bay ecology, one can construct simple food webs that show the transfer of energy between organisms, and how all organisms influence one another.

**Procedure:** Tell the group they will be preparing a shellfish meal (candies), and there will be enough for everyone in the class. However, when you go to get the clams and oysters by the dock, you see that many of them have already been eaten! Students must use knowledge of food webs and Barnegat Bay ecology to figure out who ate their meal. This exercise is adaptable for various levels, depending on the clues that are given.

Spend a few minutes describing the area where the shellfish were growing, what it sounded like and what you would see asking the students to listen for clues. Alternately, have students observe the area if in the field.

**Narrative Examples for Listening Exercise**

This example indicates someone treading for Hard Clams in the bay. Feel free to add detail regarding footprints, bird droppings, etc. To adjust this story for another species, replace the underlined phrases as indicated.

It is sunny out, and I am wading in shallow, salty water. I can hear the call of shorebirds overhead. I dig around with my bare feet in the soft, sandy bottom, looking for some shellfish. When I find them, I pick them up with my toes, and place them in a container. Something startles me, as it scuttles by near my right foot. (Optional: but I realize it's only a crab.) I collect the shellfish in a bag, and hang them off a dock piling, so they are still covered by the water.

Oysters: somewhat salty water, I drag a special rake across the hard, shelly bottom, I empty the rake's basket, inches over my right foot, snail.
Bay Scallop: in a boat, in salty water, drag a net through the water, pick up the net, dives down toward the water near me, gull.

Mussel: climbing across a rocky jetty, dig around the rock crevices at the water line; pry them off the rock, my right hand.

**Procedure: Activity - Short Term/Younger Grades**

After listening to the site description, have students identify what type of shellfish they were to eat, based on the described location. Have each student come up with a list of all of the “suspects” that would eat that type of shellfish (you may wish to provide clues, either visual or written). Individually or in groups, have them learn more about one organism that lives in the Barnegat Bay. Ask students to organize and report on the information learned.

Discuss how food chains are a very simplified concept, and the effect of predators eating different kinds on populations. What would happen if one of their preferred prey sources disappeared? Ask students if they think a human or a gull would need more or less clams to gain nutrition for a whole day. Have them discuss why in their journals.

**Procedure: Activity - In-Depth/Older Grades**

Before passing out the candies to the class, have organisms “eat” them as follows:

Crab (mostly Blue, also Green, Mud) - break off bits of the edge, and scratch and dent the candies up, but leave them partly intact

Whelk – make a slit at the mid-line of the candy but leave the shell intact

Oyster drill – poke a straight, small hole in the candies but do not crush them

Cow nose Ray – completely crush the candy, present only a few fragments of shell

Starfish – cut candies in half completely to simulate shell being pried open
Gulls – Dent in one side of the shell, as if it had been smashed against a rock
Optionally add – human…no trace whatsoever, perhaps footprints.

Have students figure out which organism caused each different kind of damage. Discuss any adaptations that help the predators to crack open and eat shellfish despite their tough shells.

**Extension: Taking it further**

Have students think of ways they can prevent predators from stealing their clams. Discuss the need for predator control in both aquaculture and natural harvesting, and generally discuss the methods used (see fact sheet).

Separate candies (by color or shape) to represent hard clams, oysters, and scallops (or mussels). Now separating different proportions of each in different “bags”, have students tell you which predators frequent that area, and if there are many or few by the ‘evidence’ they leave. This requires more research into which predators eat which shellfish, which the students themselves can do before the activity.

**Assessment:**

Assess reports on organisms
Participation in discussions
Assess Worksheets
Word Find completion

**Also See:** Nutrient Trap from Beneath the Shell, NJDEP.
Creature Creations, and/or The Competitive Edge, Barnegat Bay Seining Activity from Discovering Barnegat Bay.
Who Ate My Lunch Word Find

Barnegat Bay Food Webs

Why didn't the ocean say hello? Because it waves.

The key below has words related to Barnegat Bay Food Webs. Find the words in the puzzle and circle them.

| X | S | N | R | Q | C | U | M | N | P | T | I | A | J | X | V | B | A | Y | Z |
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| S | D | S | H | E | L | L | F | I | S | H | G | S | C | A | L | L | O | P | N |

WEB | SCALLOP | RAY | BAY
---|---------|-----|-----
SUN | WHELK   | HUMAN| BARNEGAT |
CLAM| CRAB    | PREDATOR| UPWELLER |
OYSTER| GULL | PREY | SHELLFISH |
MUSSEL| STARFISH| ALGAE| |

What the bay HINGES on...

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What the Bay HINGES on!

Who ate my lunch Word Find KEY

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