

LESSON 6

Title: PREDATORS OF *Mya arenaria*

Content Area Subjects:

Science, ELA

Grade level(s):

Grades 3 -12+

Standard(s):

Maine Learning Results

- ELA. Informational texts (A3.3.c); (A3.3.e); (A3.6.e); A3.9-diploma.b); Research (C1.3-5.a,c,d)(C1.6- 8.g); (C1.9-diploma.a,c); Listening (E1.3-diploma.c); (E1. 9-diploma.a); Speaking (E2.3-8.d); (E2. 9-diploma.a)
- Science and Technology. Ecosystems (E2.6-8.b)

Hypothesis/Brief Description:

This lesson gives a brief overview of some of the predators of the soft-shell clam, *Mya arenaria*. Students will read an excerpt and try to match the predator with its binomial name and a characteristic of its behavior or brief description of the predator. Some of the characteristics will not be as obvious in the reading lesson provided, and the students will be urged to investigate some web sites or other reading materials to gain that needed information or to use the process of elimination, depending on their age.

Adaptations for different age levels/abilities

The spider chart can be completed as a group project. Sketch the chart outline on the blackboard. Each student could hold a few cards and the teacher could help them to read what they have, or all cards could be taped up in columns for the three main categories – Binomial name, common name, characteristics. Students could take turns going up to attach cards to the spider chart as the Instructor reads orally to the students the information from Attachment D, making sure to emphasize the key phrases that will relate the predator information found on the cards. If the Instructor wants to keep the Spider chart, it could be sketched on chart paper or large construction paper. The Instructor could use pictures of the predators.

Goals/Objectives:

After reading an article describing some of the more common predators of *Mya arenaria*, the student will be able to:

Demonstrate an understanding of the information presented in the article by matching the common names with the binomial names and with characteristics of the predators.

Time needed:

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This lesson may be completed in 1 to 3 hours depending on the age of the student and the extent to which the instructor wants the students to do further research.

Keywords:

- From the master Vocabulary List: Binomial Names for predators: *Anas rubripes*, *Cancer irroratus*, *Carcinus maenas*, *Homarus americanus*, *Cerebratulus lacteus*, *Fundulus heteroclitus*, *Glycera dibranchiata*, *Euspira heros*, *Euspira triseriata*, *Neanthes virens*
- From the master Vocabulary List: binomial name, black duck, bloodworm, green crab, American lobster(also called Maine or Northern), milky ribbon worm, northern moon snail, rock crab, spotted moon snail, mummichog, sandworm, and sand shrimp.

Materials Needed:

- Worksheet-“Predators and Their Characteristics” (enough for each student);
- Answer key for “Predators and Their Characteristics” for instructor
- Copies of reading material for each student [Attachment D: “Predation and Soft-shell Clams” written by Brian Beal. Maine DMR Coastal Fishery Research Priorities (2000)12.Print];
- Spider Charts (enough for each student);
- The Instructor should develop prior to the extension activity or with the group, a Class size spider chart with class size labels for each scientific name, common name, and characteristic (to be used in the extension activity, using large white paper, and colored markers; this can be simple lines for the chart and printed pieces of paper or as involved as the group’s age allows and the Instructor wishes; the chart could be sketched on a blackboard or whiteboard
- Scissors, Glue sticks, or tape;
- Blackboard and chalk, or whiteboard and marker, or 3 pieces of card stock to represent 3 mini cards. (These items can be used by the instructor to cut out and make one set of 3 larger cards using a common name, a binomial name, and a characteristic for the purpose of illustrating the process of gluing the mini-cards together);
- Pens or pencils; and,
- Computer and access to the Internet for extension activity- finding additional predators or other characteristics of the ones the students have already learned about
- Pictures of predators (many can be found at www.downeastinstitute.org or a similar source

The Procedure:

Introduction:

The Instructor will say,

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“Today we are going to talk about some of the predators that affect the mortality rate of *Mya arenaria*, the soft-shell clam. Before we talk about predators, we will review the phrase ‘mortality rate.’

“Can, anyone remember what mortality rate means? (Establish the definition, whether by recall, by reminding them of the phrase from the Clam Field Experiment lesson, or by letting them take a quick look at the Master Vocabulary list in the science notebook.)

“Why is it important to our area to be concerned about the mortality rate for *Mya arenaria*, the soft-shell clam? (Allow student responses. The responses may draw on their own knowledge of the clam industry and on the knowledge they have gained so far through their participation in the Clam Field Experiment. Lead them to understand that the loss of clams affects the industry.)

“Why is it important to know about the predators of *Mya arenaria*? How might knowing about the predators and where they are located help a scientist decide how to plant clams or where to plant clams or how to protect clams?

“We are going to read about predators and summarize characteristics which explain how they can cause harm to the growth and abundance of *Mya arenaria*.

“We will learn about each of the predators by a common name and by a binomial name, just as we learned about *Mya arenaria*. Can anyone remember what a binomial name is?”

(If not, lead the students through some possibilities by using the prefix “bi” meaning “two” and the two names for *Mya arenaria* or the instructor can tell the students that the binomial name is the scientific name or two part name for the *genus* and *species* of a living organism and that all living animals and plants in the environment that are known about have a scientific classification of names. To further illustrate this concept, the instructor might mention that the scientific or binomial name *Homo sapiens* is for the human species to further illustrate this concept.

Key Questions

- What are the major predators of *Mya arenaria*?
- List a characteristic of a predator?
- State a common name and a binomial name for a predator? For any other living thing?
- How do these predators cause problems for the clam industry?
- What might cause a species that was not a known predator of *Mya arenaria* to become one?
- How can we use scientific reasoning to make a guess, called a “claim,” about a predator? How can we gather evidence to support or refute our claim?

Main Activity

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(The instructor will provide the sheet “Predators and Their Characteristics”, and a pair of scissors to each student.)

“Before we start to read about the predators, I want you to cut apart all of the names and characteristics from the sheet. Then spread them out on your desk/table. (Circulate and help as necessary)

“After you cut out your cards, please look at them and see if you can organize them into three columns. One column could be the binomial name or scientific name of the predator, one column could be the common name of the predator, and one column could be a characteristic of that predator. Do not worry about the correct order of each column. Our later reading will help us find the correct order and match our words together.

After all students have finished cutting out their mini-cards and organizing them into three columns, the instructor will explain, “Much of the information we need will be found in the reading of ‘Predation and Soft-Shell Clams’. Now we will read to find more detail.”

The Instructor will pass out “Attachment D” to each student. ***(Depending on the age of the students, the teacher may read the sheet with them or to them.

(If the exercise is going to partner younger student(s) with an older reader, the older student can help the younger student(s) with the reading of the article. If the sheet is to be read silently by the student, the independent work may start at this point. In the case of older students, the teacher might say something like, “All of the materials you need to learn some information about the predators of *Mya arenaria* is in your hands. You must follow the directions at the top of the Predator sheet and complete the predator match up. I want you to do as much as you can by yourself. Scientists often have to read, analyze and complete a task by themselves so I want to see if you can do this alone, by following the steps. BUT IF you have a question, it is ok to ask for help”. The Instructor will either read the article to the students, read to them while they follow along, allow their older partners to read the article, or allow them to read by themselves, depending on the age of the students.)

- It may be helpful if one section or paragraph of Attachment D is read and at the end of that section, the Instructor can say, “You should be able to make a match now. You should be able to find a predator name, the predator’s binomial name, and a characteristic about the predator. Can you find three mini cards that we just heard about”?

The students can match up name, binomial name, and characteristic. If the Instructor needs to, the section could be read again.

The reading can continue in this manner, until all sections have been read, and many cards have been matched up. There are several cards left over including *Cancer irroratus*, *Crangon septemspinosa* (sand shrimp), *Homarus americanus*, and *Euspira triseriata*. The students will be charged with using their own skills to discover what cards go with what species.

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If the instructor is not reading, circulate to make sure the students are getting the information, and assist them as necessary. Make sure that if an older reader is reading to the younger student, the older reader understands the passage can be read in shorter segments, and can be repeated.

There are eleven predators using the number of scientific names on the mini-cards. Give clues to this fact or lead them into it by having them pick out all of the binomial names-if they do not realize this might be a way to sort. The age of the group will dictate their ability to sort and match, and the instructor will adjust the amount of assistance around that aspect for the group.

The instructor will say, "Let us look at what you have discovered. Some predators are matched up with common name and characteristic, but other predators are a bit more difficult to figure out. We might not be able to figure out from our reading, but we may be able to use context clues to figure out the match. (Allow them to try to figure out) There are cards left over that we have not read about in the article. How could we find out what matches to make?" (Allow students to use their knowledge, computers, and research materials on hand to find out about these predators.)

(Depending on the age of the students, the Instructor can decide how to find out information. The students can work independently, together as a group, or in smaller groups. The instructor will have to use judgment here. For suggestions, students could do an internet search, or look at science books, encyclopedias, and in dictionaries. Allow the older students to see what they can find out.)

(If students do not have access to a computer, try to help them eliminate and select matches for the other species.)

"Now that we have our mini-cards organized, let us use glue sticks to put them together. (The instructor will pass out a glue stick to each student or team.) You can find the name card, put some glue on it under the name, cover the glue with the binomial card, put more glue under the binomial name, cover the glue with the characteristic." (The Instructor can illustrate this procedure using a classroom size set of cards that have been made up before on card stock, or the instructor could sketch out the procedure on a blackboard or whiteboard.)

"Go ahead and complete your cards." (Have the students complete all of their cards, assisting as needed.)

Conclusion

As a group, after the cards are glued together, the instructor and the students can review the lesson using their cards.

The Instructor can use the worksheet for Lesson 6 to ask questions such as, "What is green crab's binomial name? What is the common name for *Cerebratulus lacteus*? What gastropod drills a hole in the umbo section of the clam's shell prior to eating the clam? What is another name for the lobster?" The Instructor should encourage the students to try to remember, but to refer to their cards whenever

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they need to do so. The Instructor can have the students come up with questions to ask of each other.

Assessment/Follow up/Extension activity:

The Instructor can use the Spider chart activity the same day if time allows or as a review the following day. Each student should now glue eight of their predator cards on to the "legs" of their spider charts. They will have some cards left, which can be used later.

After completion, the students can review the key questions and all of the key terms by looking at their charts as questions are asked.

The Instructor could make this lesson into a visual that the students can see by making a classroom size spider chart and having students labeling it in a similar manner as their individual charts. The students could keep their charts in a notebook. If pictures of the predators were found when the students did their research, the students could sketch pictures of the predators to attach to the classroom size chart. Have them select different predators, so that at least one picture of each predator is sketched.

They will not use all of their cards, and they could begin a second chart if the Instructor wishes by looking up more predators.

This extension activity could involve more research on the Maine State Department of Marine Resources website or the DEI provided Species list to find other clam predators. Students could be encouraged to think about more birds, crabs and crustaceans, disease, eels, fish, gulls, humans, otters, raccoons, shrimp, skunks, snails, starfish, worms, and other possible predators of *Mya arenaria*, and then research to confirm.

For students in coastal communities, an interview with a current clam digger or fisherman, or a retired clam digger or fisherman might reveal many other predators. These activities could extend to a follow-up lesson.

Suggested reading for older students could include printed copies of/internet access to the following:

<http://www.maine.gov/dmr/rm/speciesinformation/htm> under "Invasive species"

Flimlin, G., Beal, B.F. 1993. Major predators of cultured shellfish. Bulletin # 180. Northeast Regional Aquaculture Center.
www.nrac.umd.edu/files/Factsheets/fact180.pdf

Maine State. Maine Department of Marine Resources. Gulf of Maine Aquarium. "Coastal Fishery Research Priorities Soft-Shell Clams (*Mya arenaria*)". Augusta: DMR Priority Meetings, 2001. Clam Priority 4, p.5. Print.

Thayer, Peter E., and Stahlnecker, James F. "Non-Native Invasive Marine Species in Maine". Report to the Maine State Legislature, Marine Resources

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Committee and Natural Resources Committee. Wallace, Dana E. "Soft-shell Clam Predators". Coastal Fishery Research priorities Soft-Shell Clams (*Mya arenaria*). (2000). 12, 13. Print.