

LESSON 11

Title: Clam: It's a Shore Thing – Internal Anatomy-Session 3

Subjects:

- Career and Educational Development, Science, Health and Physical Education, History, ELA, Math, Social Studies

Grade level(s): 3 -12+

Standard(s):

Maine Learning Results

- Career and Educational Development. Interpersonal Skills (A3.pre-k to diploma.a,c)
- 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)
- Health and Physical Education. Cooperative Skills (I1.pre-k to diploma.a-d); Responsible Behavior (I2.pre-k to diploma)
- Math. Data (B1.4-8.a,b); (B1.9-diploma); Measurement and Approximation (B1.4-diploma.a,b); (B1.9-diploma.a,b,c); (B2.3-6); (B2.7.1a, 1b); (B2.8-diploma.3)
- Science. Scientific Inquiry and Technological Design (B1.3-diploma.a); (B1.3-diploma.b); (B1.3-diploma.c); (B1.3-diploma.d); (C1.3-diploma.a)
- Social Studies. Taking Action Using Social Studies Knowledge and skills (A3.3-diploma)

Common Core:

- ELA. (V.3-12.6); (SL.3-12.1c); (SL.3-5.1); (L.3.5b);(L.3.5b)
- Science and Technology. (R.6-12.4); (R.7-12.4)

STEM Skills

Brief Description:

In three class sessions, one at the tidal flat and two in the classroom, the students will identify the major parts of the clam's shell, study the life cycle of the clam, and learn about the inner clam anatomy, using live clams, pictures, diagrams and a 3-D clam "pillow" (if available). Session 3 will focus on the internal anatomy of a clam.

Objectives/goals:

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After the completion of the activities, the students will:

- identify the main parts of a clam's internal anatomy

Time needed: One class session

Adaptations for different age levels/abilities:

The Instructor could select which key words of the internal anatomy to focus on depending on the age and ability of the students.

Keywords:

Session 1 - External Anatomy: anterior end, excurrent siphon, foot, growth rings, hinge ligament, incurrent siphon, invertebrate, left valve (shell), mollusk, posterior end, siphon, stress ring, umbo

Session 2 – Life Cycle: adult clam, egg, fertilization, juvenile clam, late pediveliger, pediveliger, spat, sperm, trocophore, early veliger, veliger

Session 3 - Internal Anatomy and Digestive System: anterior adductor muscle, anus, crystalline style, digestive gland, digestive system, esophagus, excretory pore, excurrent siphon, foot (pedal), gill, gonad, heart, hinge line adductor scar, incurrent siphon, intestine, labial palp(s), mantle, mouth, nephridia (excretory gland), posterior adductor muscle, rectum, shell, stomach, style sac, visceral mass/visceral cavity

Additional general terms: anterior adductor muscle scar, bivalve, chondrophore, dorsal, muscle scar, pallial line, periostracum, plankton, posterior adductor muscle scar, straië, umbo, ventral

Materials Needed:

Session 3

- Empty clam shells
- Worksheet “Clam Feeding and Digestion” for Lesson 11
- Diagrams of the internal anatomy of the clam found on page 14 and other clam facts from (Maine State. Maine Department of Marine Resources Education Division. “A Teacher’s Guide to Marine Life of the Gulf of Maine”. 2nd edition. 2004.13-16.Print) This guide may be downloaded from the DMR website
- **AND/OR** The clam pillow (arrange to borrow this from DEI)
- Colored internal diagram from <http://www.biodidac.bio.uottawa.ca>
- The students will be more engaged with the real “thing”. If at all possible keep a few clams refrigerated from Sessions 1 and 2 that could be looked at during this lesson. If that is not possible, have some photos of clams available.

The Procedure:

Introduction

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CLASS SESSION 3

The Instructor will explain that in today's lesson, the students will study the internal anatomy of *Mya arenaria*, the soft-shell clam. The Instructor will provide diagrams and photos with labels of the anatomy that will be presented to the students. (See Key Words for Session 3).

Key Questions

What parts of the clam can you see? Can you see the foot? the siphons?

What is the purpose of the incurrent siphon? excurrent siphon?

How does the clam use its foot to move?

How many clam parts can you name?

Main Activity

Using the empty shells, the students can identify the parts of the shell from their key words. This should be review for keywords presented in Sessions 1 and 2. Use the terms listed in "Additional general terms" and the diagram of the inner shell from BIODIDAC to further illustrate the inner surface of the clam shell, as they find the parts on both a shell and the diagram.

Using the diagrams, the students can identify the internal organs.

Conclusion

The students could review what they have learned by using the technique used in Session 2 for "teaching the teacher." They can use the clam pillow and the clam pillow list of parts as a reinforcement activity. This could be one big group or smaller groups as the instructor goes from group to group.

Assessment

The students could use the clam pillow or a diagram and practice naming the parts at a later class period.