

Topic: squid dissection, invertebrates

Overview

Through squid dissection, students will examine some of the unique features, which have allowed squid to adapt and thrive in waters throughout the world. Students will locate and identify major external and internal features and organs of a squid. Students will understand and use basic dissection techniques and terms. One of the main objectives of this activity is to introduce students to dissection. Dissection is an important part of scientific discovery that can help us better understand how life works. It is important for students to see the role that dissection plays and develop a sense of responsibility and respect for the animal that they are using as a learning tool. Encourage students to experience the many textures found inside and out side the squid's body. Moving fingertips along the suckers is suggested as well – the suckers do not scrape or hurt if you are gentle with them. After the students finish their dissection, the impact of squid on their daily lives should be discussed. Squid are an important food item to many people through out the world. Students will be aware of the importance of squid in the scientific community as well as the economic impact.

Grade 5

Time Allotment

One 60-minute period

Learning Objectives

On completion of this lesson, students will be able to:

- Examine some of the unique features, which have allowed the squid to adapt and thrive in waters throughout the world
- Understand and use basic dissection techniques and terms
- Locate and identify major external and internal features and organs of a squid.

This lesson addresses Va. Science SOLs 5.5, 5.6

Media Components

- Computer with browser, Internet capabilities, and projection device
- Video camera- for the classrooms without Elmo. Use video camera to show dissection on the TV screen.
- Digital camera-used by students opting out of the dissection
- Scanner-used by students opting out of the dissection
- Websites:

<http://gaintsquid.msstate.edu/LessonList/dissection.html> Directions for dissecting a squid.
http://wings.avkids.com/Curriculum/Marine/dissecting_howto.html Student-made video of squid dissection.

<http://www.thewildones.org/Curric/squid.html> Elementary student dissecting a squid.
<http://www.enchantedlearning.com/subjects/invertebrates/squid/label/> Handouts of the internal and external parts of the squid. The 10 question test for the students which they use the squid pen and ink to take the test.

Materials and Student Handouts

- Whole squid-1 per 2 students
- Basic student scissors-1 pair per group
- Paper plates (the oval type with the turned up edge is best)-1 per group
- Paper towels-1 roll per group
- Newspaper-enough to cover the table for each group
- Toothpicks-5 per group (used to by students who prefer not to touch))
- Hand lens-1 per student
- Microscope-1 or as many as you can get
- Student Handouts 1 – internal squid 2- external squid 1 per student
<http://www.enchantedlearning.com/subjects/invertebrates/squid/label/>
download and enlarge the pictures.
- SQUID TEST
<http://www.enchantedlearning.com/subjects/invertebrates/squid/label/>
download and enlarge for each group.
- Material for food preparation:
 - portable fryer and oil
 - 2 containers for milk
 - flour mallet (for tenderizing)
 - seasoned flour (such as Dixie Fry)
 - buttermilk
 - cocktail sauce (optional)

Teacher Preparations

- Look for squid at the local supermarket in the seafood and frozen sections. You may have to order it in advance. For areas that have them, you can also go to the local fish market or oriental foods stores, or you can deal directly with fishermen. **Ward's Middle School Science** catalog also carries squid. Squid specimens tend to deteriorate rapidly. Keep all squid frozen until the morning before dissection. Thaw the squid in the refrigerator. If the entire dissection cannot be completed in one day, do the external activities while the specimens are still partly frozen, and the internal activities the next day. Squid may have tentacles or arms missing. Individual squid vary internally, and their relative maturity determines which organs are formed well enough to be seen clearly and which have lost or have not gain their shape and coloration.
- Search and bookmark or PortaPortal potential websites dealing with squid dissection.
- Check for the availability for the projection equipment for the time needed.

- Get video tape (blank)
- Gather supplies for dissection.
- Warn students of the possible odor and time of dissecting.
- Prepare overhead of external and internal parts of the squid.
- Prepare handouts for students.
- Prepare materials for those students opting out of the hands on experience. See note following Learning Activities.

Introductory Activity

Teacher Note: Studying squid will be the culminating activity for the unit on Oceans. We talk about the food webs, zones of life, vertebrates and invertebrates to give the context for where squid fit in. The squid is one of the most highly developed invertebrates. Some of the animal's structure explored in this lesson illustrate the ways in which the squid has adapted to life in the ocean. Its streamline body and "jet propulsion" which occurs as the squid squeezes water out of his body through its siphon, make the squid a fast, active predator. This animal also has a very good defense mechanism. Teacher will demonstrate the entire dissection for the class before asking them to do it. A video camera will be used to aid in the viewing for all students. As I do each step I will pause to ask questions and reinforce the concept.

Learning Activity

Focus: Begin the activity by asking students what they know about squid. Refer to the introduction on squid. Encourage questions, possibly making a list on the board that you may be able to answer as you continue through the dissections. Possible questions relating to anatomy might include:

- How does it eat? What does it eat?
- How does it swim? How does it stir?
- How does it protect itself?
- Is it male or female? How can you tell?
- Where does the squid fit into the marine food web?
- What adaptations does the squid have?
- Have you ever used a squid for food or as fish bait?

Using one squid for demonstration and the diagram of external anatomy, begin to discuss the external anatomy and relate the features to the way the squid functions in its marine environment. Important features to point out are the **arms** and **tentacles**, for hunting and mobility, the **fins** for stabilizing and turning the squid while swimming, and the **chromatophores**, which can change color to aid in finding a mate, or in warning other squid

Activity: Once the students are prepared for the dissection, equip each student, or pairs of students with a squid on a paper plate. Use newspaper to cover the area where they are working. Place the squid with the dorsal (back) side up in the plate. (fin side up)

A. Ask students to identify the external anatomy of the squid. (head, eyes, beak) Make sure they count the number of arms and tentacles. Have the students pull back the arms to locate the beak. Open and close the beak, noting how the ventral beak overlaps the dorsal beak. As they identify the features, they can fill in the spaces on their anatomy handout. Use the hand lens to examine the suckers on the tentacles and arms as well as the spots on the skin, which are chromatophores.

B. After the students have had the opportunity to explore the external anatomy, they are ready to begin the dissection. Instruct the students to position the squid on the plate with the siphon facing up. A squid swims by squirting water from the mantle through the funnel. The direction it swims depends on which way the funnel is aimed. Move the funnel and note its flexibility.

C. Distribute scissors. These are the easiest tools to work with. Ask students to make one long incision from the bottom of the mantle, above the siphon, to the tip of the mantle next to the fins. Be sure to instruct students to **lift up with their scissors when cutting so as not to cut into the internal organs of the squid.**

D. Spread the mantle open and have the students identify the internal anatomy. Begin with locating the feathery gills and following those to the base to locate the hearts. Next have the students locate the gonads and explain the difference between the male and the female gonads. Have the students view both sexes to see the difference.

E. When the students have located all of the internal organs, they can remove the arms and internal organs from the mantle. Have the students pick up their squid by the arms and while holding the mantle in the hand, pull to separate the arms from the mantle. If done properly, the arms and internal organs will all come off in one piece. Students may notice a thin shell-like pen inside the mantle. They can pull the pen out of the mantle. Some may need to snip it out using scissors. Press or push out ink with your fingertip much like you would a tube of toothpaste. Students will use this ink take the SQUID TEST.

Follow-up: Place finished handouts on a bulletin board in the classroom for the students and parents to admire the work.

When finished, clean your area completely. Return all equipment and wash your hands. The squid odor will remain for a little while. Lemon juice will alleviate the odor if you find it offensive.

Note: Alternative Activity for students with moral or ethical reasons for not wanting to dissect or students who feel this activity would make them uncomfortable.

Objectives:

- Examine some of the unique features, which allow the squid to adapt and thrive in waters throughout the world.
- Locate and identify major external and internal features and organs of a squid on the handouts using the PowerPoint or video.
- Create a PowerPoint on Squid using the camera and scanner
- Prepare a folding booklet with information found on squid.

Culminating Activity

Squid Cook Off

- Have the students remove the fins, then clean the mantle by removing any of the excess skin.
- When the mantle is clean, have the students cut the mantle into strips, starting from the bottom of the mantle to the tip. Once the strips are cut have the students tenderize the squid by pounding it a few times with a block or meat hammer.
- The students should first coat the squid strips with buttermilk, and then roll them in the seasoned flour mix. The teacher can then drop them carefully into the pre-heated deep fryer, and let them cook until they curl up and float to the top of the oil, approximately 1 minute. An adult should do the cooking to prevent burns or other injuries.
Garnish with cocktail sauce and enjoy!

Assessment

- Written grade = successful completion of the external and internal handout.
- Participation grade. = Participating activity in the dissection or opt out work.
- Squid test

Community Connections

- Invite parents in for viewing of their handouts displayed on the bulletin board
- Have students prepare Calamari for parents and student to sample.

Cross-Curricular Extensions

English

- Have students design the invitations for the parents. Included should be written descriptions of the process of dissection or essays on sea life.

Art

- Drawing of sea life.

Technology

- Have students develop a PowerPoint presentation together to be added to the school's web page.

Extensions: The following parts of the squid make excellent specimens for microscopic study:

- Eggs from the ovaries
- Suckers
- Tips of arms and tentacles
- Stomach contents
- Skin and chromatophores
- Portions of the eye
- Beak

	Flip Your Lid for Squid Mari Evelyn Sours and Patti Hobbs Shenandoah County Public Schools	
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About the Authors

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