



Spectacular Squid

View the video “Squid Spawning” to learn about the short life of the opalescent squid. Complete additional activities to further investigate the habitats and adaptations of squid and their relatives.

SUBJECT

Science

GRADE LEVEL

5–8

STANDARDS

National Science

Education Standards

Grades 5-8

www.nap.edu/readingroom/books/nses/6d.html#ls

Life Science -

Content Standard C:

Structure and function in living systems

Reproduction and heredity

Regulation and behavior

Populations and ecosystems

Diversity and adaptations of organisms

Content Standard F:

Natural hazards

Ocean Literacy: Essential Principles and Fundamental Concepts

<http://coexploration.org/oceanliteracy/>

Essential Principle #5:

The ocean supports a great diversity of life and ecosystems.

Essential Principle #6:

The ocean and humans are inextricably connected.

SQUID SPAWNING

Watch it online at

<http://www.pbs.org/kqed/oceanadventures/video/squidspawning>

Video length: 4 minutes 30 seconds

BACKGROUND

Squid are soft-bodied creatures belonging to phylum Mollusca, class Cephalopoda. Other members of this class include octopuses, cuttlefish and nautilus. Cephalopods have large brains relative to their body size and are considered to be the most intelligent invertebrates. They also have well-developed eyes.

Unlike an octopus, which has eight arms and no tentacles, a squid has eight arms and two tentacles. The inner surfaces of the arms are covered entirely with suckers, whereas the tentacles, which are longer, usually have suckers only at the end. To capture prey, a squid rapidly extends its tentacles, grasps the prey, then brings it to its mouth. A squid’s mouth is located in the center of its ring of arms and contains a hard beak that is used to bite off pieces of the prey.

The body of the squid is covered with skin containing pigment cells called *chromatophores*. Squid and other cephalopods have the amazing ability to control their chromatophores by contracting and relaxing the muscles around these cells. They can rapidly change from one color to another; some can become striped, and some can even undulate with color. They may change color and pattern as a warning or during different behaviors, such as feeding and mating. Squid have an ink sac that they use as a means of defense. They expel ink to confuse predators, then escape by jetting away.

Opalescent, or market, squid (*Loligo opalescens*) live along the Pacific coast of North America. They spend their days in deep waters, coming up to the surface at night to feed. Juvenile opalescent squid feed on plankton. Adult squid eat a variety of organisms, including fish, worms, shrimp and even other squid. They are preyed upon by many species of fish, sea birds and marine mammals. Much of this predation happens when the squid move inshore to spawn. During spawning, female squid attach capsules, each of which contains hundreds of eggs, to the sandy sea floor. The life span of these squid is short – less than a year.

VIEWING IDEAS

- Before viewing the video, stimulate students' pre-existing knowledge with the Pre-Viewing Questions (see next section). List their answers to these questions on a chalkboard.
- First let students view the video without sound. Tell them to record any questions they have on a piece of paper while they watch. Afterward, have the class share questions. Watch the video again, with sound, and tell students to listen for answers to their questions.
- After watching the video with sound, have the class discuss what they learned and also review their answers to the Pre-Viewing Questions to see if the students wish to add or change information.

PRE-VIEWING QUESTIONS

- Have you eaten calamari? What is it? Where does it come from? *calamari is made from squid*
- What do you know about squid?
- Are squid fish? Why or why not? *squid are invertebrates; they don't have a backbone*
- What animals are relatives of the squid? *octopus, cuttlefish, nautilus*
- Squid (and octopuses) are part of a class of animals called *cephalopods*. The word *cephalopod* literally means "head foot." Why do you think they were named this?

POST-VIEWING ACTIVITIES FOR STUDENTS

- Research some other cephalopods, such as octopuses and nautiluses, and other species of squid. In what types of ecosystems are they found? Are their habitats different from or similar to that of the opalescent squid? How does their prey differ? How long do they live?
- Think about and discuss ways in which humans communicate nonverbally. Then imagine that our skin had chromatophores that we could control. How would you choose to use these cells? What would you communicate? Draw a picture of yourself with chromatophores. Create a pattern that would show others if you were angry, happy or excited or that would communicate something else.
- Dissect a squid. Get close to a real squid and learn about its anatomy. Make calamari with your dissected squid when you're through! (Whole squid can often be found in the frozen section in the supermarket.)

- Look at the following table, which shows the amount (in tons) of opalescent squid caught in Southern California during each fishing season from the years 1993 to 2003. An “El Niño” event occurred during the 1997–1998 season, and the ocean water was unusually warm. Discuss the impact this had on squid fishermen that season. Then hypothesize how climate change could affect the squid fishery.

Squid Fishing Season	Squid caught (in tons)
1993–1994	44,440
1994–1995	44,489
1995–1996	90,157
1996–1997	118,481
1997–1998	1,623
1998–1999	11,673
1999–2000	126,464
2000–2001	115,681
2001–2002	92,621
2002–2003	19,166

Source: California Department of Fish and Game, *Final Market Squid Fishery Management Plan*, http://www.dfg.ca.gov/marine/msfmp/pdfs/section1_chap2.pdf.

ACTIVITY RESOURCES

The Cephalopod Page

Dr. James Wood

<http://www.thecephalopodpage.org/>

How Squid Change Color

Marine Biological Laboratory, Woods Hole

http://www.mbl.edu/publications/pub_archive/Loligo/squid/skin.0.html

Kings of Camouflage

(video clips of color-changing cuttlefish), NOVA

<http://www.pbs.org/wgbh/nova/camo/change.html>

Squid Dissection

The Education Program at the New Jersey Marine Sciences Consortium

http://www.njmssc.org/education/Lesson_Plans/SquidDissection.pdf

Smithsonian Institution's National Museum of Natural History

<http://giantsquid.msstate.edu/LessonList/dissection.html>

Calamari Recipe

Recipezaar

<http://www.recipezaar.com/34526>

CREDITS

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