



NOAA FISHERIES

Grade Level
9-12

Materials

- Computer, iPad, or laptop
- Copies of student handouts
- Large sheets of white paper for each student
- Construction Paper
- Markers/Colored pencils

Audio/Visual Materials

- Projector
- Laptop/iPad/Computer with internet

Teaching Time

Three 45-minute class periods

Seating Arrangement

Flexible

Key Words

- Sustainability
- Fisheries
- Overfishing
- Fisheries management
- Bycatch

The “Dish” on Your Fish

For use with Fish Watch at www.fishwatch.gov



Focus

- Sustainable fishing

Focus Questions

- What is sustainability as it applies to fishing?
- Why is seafood sustainability important?

Learning Objectives

- Explain the concept of sustainability
- Describe how it applies to fish species

Background Information

Sustainable seafood is a hot topic these days. “Sustainability” is based on a simple principle - meeting today’s needs without compromising the ability of future generations to meet their needs; for example, using a resource but leaving some for the future. In terms of seafood, this means catching or farming seafood responsibly, with consideration for the long-term health of the environment and the livelihoods of the people that depend upon the environment. For example, U.S. seafood is wild-caught and farm-raised under strict regulations that work to keep the environment healthy, fish populations thriving, and our seafood industry on the job.” (Source: www.fishwatch.gov)

National Science Education Standards

Grades 9-12

Content Standard C: Life Science

- Behavior of organisms

Content Standard F: Science in Personal and Social Perspectives

- Environmental Quality

Ocean Literacy Essential Principles

Essential Principle 6

The ocean and humans are inextricably connected.

Fundamental Concept b

From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our economy, serves as a highway for transportation of goods and people, and plays a role in national security.

Fundamental Concept e

Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

Fundamental Concept g

Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean.

In this lesson, students will learn about sustainability and the issues we face in our ocean food web due to declining fish populations. Some fish are being removed faster than they can be replenished, and through this lesson, students can learn how they can become informed consumers to promote sustainable seafood.

Around the world, fisheries are threatened with collapse due to unsustainable fishing methods and ecosystem destruction. There are a variety of factors affecting the oceans and its inhabitants around the United States. Bycatch, habitat damage, and over-fishing are the primary causes in recent times of the decline in species in the aquatic environment. Bycatch results from fishing methods such as longlining and bottom trawling, which involve using very large nets to sweep through the water. Fishermen target a certain species, but the nets and lines catch other marine life in their path. This is a significant problem for threatened and endangered marine species. Turtles, whales, and dolphins often become entangled in nets and lines that hinder their ability to catch food or prevent them from surfacing to breathe.

Habitat damage is evident in various ecosystems along the coastal United States. Coastal waters suffer from the constant population growth along the coasts. Bottom trawling drags nets over the seafloor to catch fish, scallops, sea urchins, and crustaceans, but nets and the other gear damage coral and places where fish feed and breed.

Between 1950 and 1994, commercial fishermen increased their catch by 400% to keep up with the growing demand for seafood. Since 1989, many fish species have been over-fished (fish are caught faster than they can reproduce). However, new boats are still being set into the waters every year around the world. Examples of over-fished species include: cod, some sharks, and bluefin tuna.

NOAA biologists research marine habitats to determine the number of fish in an area, and the overall health of those fish and their environment. Fisheries management, regulation, and enforcement are important in order to prevent overfishing and to maintain marine populations, which will allow for fishing in the future. Educating the people in fishing communities, as well as tourists, politicians, and other stakeholders about the impacts that overfishing and pollution have on our marine habitats is critical. Research, regulations, enforcement, and education are all important elements for maintaining a healthy fishery. For more information on Fisheries Management refer to www.fishwatch.gov/wild_seafood/managing_fisheries.htm

Learning Procedure

1. Display the word “sustainability” and give students three minutes to write as many synonyms for the word as they can. Share their answers and record.
2. Explain to students that they will be learning about sustainability as it relates to fisheries. Revise the list of synonyms based on this new information. Optional: Have students write 1-2 things they would like to know about sustainable fisheries on sticky notes, share their ideas, and post the notes on a chart for later reference..

3. Students will need to have the use of computers for this lesson. Have students go to www.fishwatch.gov to learn about sustainability. Refer them to the *Glossary* for the definition of “sustainable.” They can also visit “Choosing Sustainable” from the *Buying Seafood* tab. Encourage students to continue to explore the FishWatch site to learn as much about sustainability as possible.
4. Have them take notes on what they learn and have a class discussion.
5. During their internet research of the FishWatch site, students may come across the site for the Office of Sustainable Fisheries. Direct students to this site if they have not already found it: www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm. Have them click on the most recent quarterly stock status map to identify overfished stocks in your region.
6. Each student will choose a fish from the overfished list for your region. (If there is only one fish, have students also choose from a region close to yours to increase the selection.) Encourage students to learn as much about that fish as possible. The seafood profiles on the FishWatch site are a good place to start. As students are researching, have them complete the *The Dish on My Fish* handout (see attached).
7. Once students have completed their handout, students will be encapsulating their information. Explain to students that encapsulating is a way of summarizing or condensing information. Students must choose which pieces of information are most important, and which most reflect their fish and the issues of sustainability. They will create symbols or phrases to convey that information.
8. Share examples of encapsulation such as personalized license plates, company slogans, flags, universal symbols, etc.
9. Hand out the Fisheries Coat of Arms directions (see attached) and a large sheet of white paper to each student. Explain that a “coat of arms” is a unique design on a shield that is used to cover and protect armor and to identify the wearer (think of knights in the olden days). The coat of arms is a symbol unique to an individual person, and to his family, corporation, or state. Students will design a coat of arms for a fish species. Review the directions and encourage students to use The Dish on My Fish handout to help them.
10. Students will work independently on their *Fisheries Coat of Arms* activity. When finished, students will present their Coat of Arms to the class.
11. After completing the activity, refer back to the K-W-L chart and ask students to share what they have learned. Record their new knowledge on the chart under the *L* column.

The Bridge Connection

www.vims.edu/bridge

Under Ocean Science Topics, click on Human Activities, then Environmental Issues, then Policy, Sustainability, or Conservation.

The “Me” Connection

Ask students to discuss what they can do to promote seafood sustainability in their community.

Connections to Other Subjects

English/Language Arts

Evaluation

The Coat of Arms product can serve as the assessment for the lesson. The activity should demonstrate their knowledge of the fish they researched, their ability to encapsulate, and their understanding of the issues underlying sustainability.

Extensions

Students can create a pamphlet about sustainability to educate community members. The pamphlet could include all overfished species, as well as ways to promote sustainable fishing and seafood consumption.

Additional Resources

NOAA Fisheries FishWatch

www.fishwatch.gov

NOAA Fisheries Service

www.nmfs.noaa.gov

NOAA Fisheries Office of Sustainable Fisheries

www.nmfs.noaa.gov/sfa/sfweb

NOAA Fisheries Office of Science and Technology

www.st.nmfs.noaa.gov/StockAssessment/StockAssessment.html

Coat of Arms Activity

Directions:

1. On a large piece of blank white paper, draw a shield and separate it into 4 sections.
2. As the expert on the fish you have chosen, you have to make a decision what you should put in each section to educate others about your fish, the issues your fish is facing, and the solutions for making this fish sustainable.

Remember: This is a “Coat of Arms” for your fish. It is meant to represent your fish, and you are encapsulating everything you have learned. Your coat of arms should be easy to read and understand. You may include words, but they should be limited to just a few – perhaps a motto or slogan that represents your fish.

3. Use markers and/or colored pencils to illustrate your work.

Sample styles:

