

RESOURCE LIBRARY
ACTIVITY : 1 HR

Exploring Sustainable Seafood

Students create a game board using a sustainable seafood guide. They play a game to explore why some seafood is considered sustainable and how choosing sustainable seafood can have a positive impact on the environment.

GRADES

3 - 5

SUBJECTS

Arts and Music, Biology, Ecology, Earth Science, Oceanography, Geography, Human Geography

CONTENTS

2 PDFs, 36 Images, 1 Link

OVERVIEW

Students create a game board using a sustainable seafood guide. They play a game to explore why some seafood is considered sustainable and how choosing sustainable seafood can have a positive impact on the environment.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/exploring-sustainable-seafood/>

DIRECTIONS

1. Activate students' prior knowledge.

Review the term resource and the concept of sustainability. Ask: *What types of resources do you use in your daily life? Do you think those resources will ever run out? What if it is a resource you have to share with your family or friends?* Emphasize the idea that a resource is sustainable if its use can be continued for a long period of time without destroying the environment or preventing other living things from being able to use it. Tell students that

there are many reasons why certain types of seafood are not sustainable. Some of the reasons that they are non-sustainable include overfishing, becoming rare or endangered, water pollution, and the lack of adults that are able to breed. In this activity, students will focus on the effects different fishing methods have on the sustainability of seafood.

2. Have students brainstorm different types of seafood uses and fishing methods.

Write the head Seafood Uses on the board. Ask students to brainstorm a list of seafood uses. Students will suggest that people eat seafood, but prompt them to remember that fishing provides jobs for many people. Seafood is often used in other foods and products for humans, such as in fish oil in vitamins and for pet and livestock feed. Many people also fish for recreation, or fun, which brings in money for local economies through tourism. Next, write the head Fishing Methods on the board. Ask students to brainstorm ways people catch fish and prompt them, as needed, by referring to movies or images they may be familiar with such as *Finding Nemo*. Their suggestions may fit into the following categories:

- **Fishing poles and lines**—methods vary from one person with one fishing pole to a boat with many fishing lines trailing or left out in the water for many days
- **Nets**—nets pulled through the water like a sieve or a strainer, or left in place to catch animals as the water passes through the nets
- **Dredging (scraping the bottom)**—a net towed behind a boat along the bottom, stirring up bottom fish
- **Traps**—left in place in the water and collected at intervals by fishermen and/or boats
- **By Hand**—spearing, harpooning, or collecting animals by hand
- **Farming**—in the ocean, along the coast, or inland; fish produced by mating or purchasing eggs or young fish, or caught as young fish in the wild and raised in pens, ponds, or nets

3. Discuss the problems and benefits of fishing methods and view photographs of commonly eaten seafood.

Distribute copies of the handout Problems and Benefits of Fishing Methods to each student. Give them time to read the handout. Then discuss new or challenging terms and any questions they may have. Note which fishing methods from the brainstorm session are on the handout, and point out other methods that were not discussed. Ask students to share names of fish that they or other family members may have eaten. Connect the seafood they identify with pictures from the Commonly Eaten Seafood photo gallery. Briefly review the handout and ask some targeted questions to check for comprehension. Ask: *Why do you think nets*

and fishing poles catch bycatch? Why would lost traps be a problem? Remind students that the handout shows several categories of fishing methods, and that more specific ways to fish are in each category. Ask students exploratory questions, such as: *Have you ever seen a fishing line with more than one hook?* Discuss the difference between longlining from a commercial boat versus a single hooked line from a pole on a beach.

4. Have students construct sustainable seafood game boards.

Distribute a copy of the handout Game Board Example to each student as a model of what their game boards should look like. Then, as a class, follow the bulleted steps below.

- Provide each student with a paper plate, a brass fastener, half of a 5×7 index card, the seafood guide for your region, and colored markers. Instruct students to use a dark colored marker to divide the paper plate into 6 equal sections like a pie on the front and on the back. Have them label the sections 1-6 and make sure the lines and numbers match on both sides of the plate.
- Give students enough time to choose six types of commonly eaten seafood that they want to include in their games, using the Commonly Eaten Seafood photo gallery or organisms from the seafood guide provided. In the six sections on the front of the plate, have students draw each type of seafood.
- On the back of the plate, in each corresponding section, have students write the name of the seafood, how it was caught or farmed, whether it is sustainable or non-sustainable, and one reason why.
- To make their game board spinners, instruct students to cut the index card into a strip with a pointed end. Then push the fastener through the straight end of the card and the middle of the plate to connect the spinner to the plate.

5. Have students play the game and check their answers.

Divide students into pairs. In pairs, ask each student to spin their partner's game spinner once and make a guess as to whether the fish is sustainable or non-sustainable. Students should defend their guesses based on what they learned in this activity. Have the creator of the game board explain why the fish is sustainable or non-sustainable based on the Problems and Benefits of Fishing Methods handout. Then have pairs separate, with each student finding a new partner. Allow enough time for each student to have six guesses with six different partners.

Modification

For demonstration purposes, construct a sample game board prior to the start of class and make another one along with students during class. Or, for younger students or classes with limited time, prepare the paper plates in advance by dividing the front and back into six sections and numbering them.

Informal Assessment

Rotate around the room while students are interacting with the game boards and partners. Listen to their guesses and explanations about why a fishery is or is not sustainable.

Extending the Learning

- Encourage students to play the sustainable seafood game with peers in other classes, and at home with family members.
- Have students create a report card of the local restaurants that offer seafood. For homework, ask students to visit a restaurant or find an online menu for a local restaurant. Encourage students to contact the restaurant and ask whether each seafood item on the menu was caught or farmed. Using their Seafood Watch Pocket Guide and the restaurant's responses, ask students to give restaurants an A for all sustainable items, a C for a mixture of sustainable and non-sustainable items, or an F for no sustainable items. Bring the class together and make a class list of all local restaurants and their grades.

OBJECTIVES

Subjects & Disciplines

- Arts and Music
- **Biology**
 - Ecology
- **Earth Science**
 - Oceanography
- **Geography**
 - Human Geography

Learning Objectives

Students will:

- distinguish between different fishing methods
- determine if certain seafoods are sustainable or non-sustainable based on different fishing methods
- use a seafood guide and game to educate others about sustainable seafood and fishing methods

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Discussions
- Simulations and games

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information Literacy
- Critical Thinking Skills
 - Applying
 - Creating
 - Remembering
 - Understanding

National Standards, Principles, and Practices

NATIONAL COUNCIL FOR SOCIAL STUDIES CURRICULUM
STANDARDS

- Theme 3:

NATIONAL GEOGRAPHY STANDARDS

- **Standard 11:**

The patterns and networks of economic interdependence on Earth's surface

- **Standard 14:**

How human actions modify the physical environment

- **Standard 16:**

The changes that occur in the meaning, use, distribution, and importance of resources

NATIONAL SCIENCE EDUCATION STANDARDS

- **(5-8) Standard C-3:**

Regulation and behavior

- **(5-8) Standard F-2:**

Populations, resources, and environments

- **(K-4) Standard C-3:**

Organisms and environments

- **(K-4) Standard F-3:**

Types of resources

- **(K-4) Standard F-4:**

Changes in environments

- **(K-4) Standard F-5:**

Science and technology in local challenges

OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

- **Principle 6g:**

Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- 5×7 index cards (cut in half horizontally)
- Brass fasteners
- Colored markers
- Paper plates
- Scissors

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per small group, Projector

PHYSICAL SPACE

- Classroom

SETUP

Before class, set out all seafood guides and materials for making board games at each student work station.

GROUPING

- Large-group instruction

OTHER NOTES

Before you start this activity: Print or request free Seafood Pocket Guides for your region from the Monterey Bay Aquarium website. Then, time permitting, give each student a pocket guide, explain how they work, and use the guides to check students' answers when spinning each other's games. These guides are also available as free iPhone applications.

BACKGROUND & VOCABULARY

Background Information

As world population grows and technology changes, the pressure on the ocean's fish increases. More and more people rely on fish for their diet and/or their livelihoods. Faster, more-refrigerated boats increase the number of fish caught. The combination of increased

demand and increased pressure has negatively impacted the ocean's fish stocks—some fish are in danger of being out-fished and disappearing.

The word *sustainable* has many meanings, but when it is applied to seafood, it often has a specific definition. *Sustainable seafood* is "fish or shellfish that are harvested, farmed, or fished in a manner that ensures healthy stocks into the future." Different institutions use different criteria to determine what seafood is sustainable, but they consider the following:

- the fish or shellfish populations are healthy and abundant;
- fish stocks are well-managed by a reliable party and are monitored;
- fish are farmed, harvested, and fished in a manner that is not detrimental to the surrounding environment; and
- occasionally, human health risks are considered. Fish that are high in contaminants, such as mercury, are not sustainable.

The word *sustainable* refers to the way fish are farmed or caught, not to the process the seafood undergoes after, or how it is packaged or distributed. Institutions such as Monterey Bay Aquarium publish seafood guides to help consumers choose sustainable seafood at restaurants and grocery stores.

There is no single rule or condition that fits all fish and is considered sustainable for all fisheries. Each category of fishing method has its benefits and disadvantages, and how methods are applied will vary. For example, shrimp is considered sustainable if it is farmed or wild caught in the United States because of stringent regulations on shrimp farms, which protect the surrounding environment, and regulations placed on nets and boats for catching shrimp. However, imported shrimp is largely unregulated and is generally considered non-sustainable because of the lack of regulations on a method that is generally detrimental to the environment. Salmon, on the other hand, is generally considered non-sustainable if it is farmed (often called Atlantic salmon), because of the impact the inland open pens have on the surrounding environment. Wild-caught salmon from Alaska is considered sustainable because it is well-managed, not overfished, and populations are healthy. Salmon from California is not considered sustainable because the spawning grounds are at risk and are quickly disappearing, putting the salmon populations at risk.

Some fishing gear can be harmful to the environment and, if used to fish, cause a species to be considered non-sustainable. For example, long-lining results in bycatch due to three things: the enormous amount of fishing line in the water; the non-specific nature of the fishing gear; and the large amount of gear lost to the sea forever as “ghost” gear that continues to ensnare sea life after it has been disconnected from the boat. However, a fish of the same species that is caught via trolling or with a pole and line may be considered sustainable because: the fishing method only targets that species of fish; there is very little bycatch; and the fishing method can only produce so many individual fish per effort.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
bycatch	<i>noun</i>	fish or any other organisms accidentally caught in fishing gear.
natural resource	<i>noun</i>	a material that humans take from the natural environment to survive, to satisfy their needs, or to trade with others.
overfish	<i>verb</i>	to harvest aquatic life to the point where species become rare in the area.
resource	<i>noun</i>	available supply of materials, goods, or services. Resources can be natural or human.
seafood	<i>noun</i>	fish and shellfish consumed by humans.
sustainability	<i>noun</i>	use of resources in such a manner that they will never be exhausted.
sustainable	<i>adjective</i>	able to be continued at the same rate for a long period of time.
water pollution	<i>noun</i>	introduction of harmful materials into a body of water.

For Further Exploration

Websites

- [National Geographic Environment: The Ocean—The Impact of Seafood](#)

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