



Science Unit: *Marine Critters & Communities*

Lesson 6: *People & the Ocean*

School Year: 2007/2008

Developed for: L'École Bilingue, Vancouver School District

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Grade level: Presented to grades 2 - 3; appropriate for grades 1 – 6 with age appropriate modifications; Présenté au niveau de la 2e et 3e année; approprié aux niveaux de la 1re à la 6e année en y apportant les modifications nécessaires.

Duration of lesson: 1 hour and 20 minutes

Notes: This lesson was taught in a French immersion school.

Objectives

1. To learn how people are connected to the oceans
2. To discover what choices we can make to help the seas

Background Information

The main goal of this lesson is to have students consider the many different ways that people use the ocean and to learn how we can make choices to help the seas. Human beings are intricately connected to the ocean. We enjoy it in a plethora of ways for pleasure and entertainment, we use it for travel, goods are transported across seas in ships, and most importantly we harvest fish and seafood from the oceans for food. Currently 90% of the world's fish production is caught from the oceans and seas, and >70% of wild stocks are fully exploited or overexploited. This depletion has serious implications for food security and economic development, social welfare, and the health of marine ecosystems. One way that consumers can help this situation is by choosing to only consume fish and seafood that are caught from sustainable fisheries.

Vocabulary

<u>Word</u>	Brief definition.
Fishing methods	The variety ways to catch fish. Fishing methods can damage the seafloor (i.e. bottom trawling and dragging) and other methods can have little impact on the seafloor (i.e. long-lining, hook-and-line fishing and trap fishing)
Overfishing (overexploited)	The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse
Trawling	Dragging a trawl net through the water or along the seafloor (called bottom trawling) to catch fish or other commercially important species (e.g. shrimp)
Bycatch	Unwanted fish and animals caught accidentally in fishing gear and discarded overboard, dead or dying
Trap fishing	Use of submerged cages made of wire or wood (called traps or pots) to attract fish and hold them until fishermen return to haul in the gear. Traps or pots may or may not be baited



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Responsible fishing	Fish that are caught with methods that do minimal damage to the seafloor, that avoid bycatch and that are caught from stocks that are not overfished
Sustainable seafood	Fish and other seafood caught by responsible fishing

Materials

For Activity 1

- Aquarium
- Sand
- 6 different colored beads (20-30 of each color)
- Pipe cleaners
- Small net or strainer
- 2 bowls for sorting beads

For Activity 2

- Seafood choice cards, see Worksheet 1 for a simpler version of the online choice card (www.seachoice.org)
- Menus (5 or > different ones depending on class size). See Worksheets 2a – 2f.
- Pictures or drawings of all species on the choice cards
- Large seafood choice poster for hanging up in class (this can be a blown up version of the students seafood choice card)

Introductory Discussion

1. HOOK: Start with a class discussion/brainstorming session on how people use the ocean. Teacher or scientist writes down the list, and then the scientist selects fishing to continue the discussion. Describe how fishing is the biggest way that people use ocean resources, and that most of the fish we eat are wild caught. Explain overfishing and describe 2 main fishing methods (bottom trawling and trap fishing). Ask class which of the 2 methods they think is more responsible and why.
2. OTHER ITEMS TO REVIEW: Review the concept of responsible fishing, incorporating the idea of overfishing (overexploitation), habitat damage and bycatch. There are many different trawling animations that are available on-line to aid discussion.
3. BRIEF DESCRIPTION OF SCIENCE ACTIVITIES: (1) trawling demonstration, and (2) sustainable seafood activity.

Science Activity/Experiment

Activity 1: Trawling demonstration

- Set up an aquarium with sand, a selection of 5 different colored beads to represent 5 different fish/seafood species, and pipe cleaners sticking up out of the sand in random places to represent habitat (i.e. seaweed or coral)
- Explain that we are pretending to be shrimp trawl fishermen, and that to catch the shrimp (orange beads) we will drag a net along the sand (to imitate bottom trawling).
- Teacher or scientist drags the net through the sand while students watch
- Ask volunteer students to sort the catch into the different species (colored beads) and habitat pieces (pipe cleaners). Count the following:
 - Targeted catch or “shrimp” (orange beads)
 - Bycatch (amount of all other colored beads)
 - Habitat damage (number of pipe cleaners caught or knocked over during dragging)



- End with a brief discussion of the negative impacts of bottom trawling

Activity 2: Sustainable seafood activity

Pre-class setup:

- Print 5 different menus, 5 students seafood choice cards (see Materials for Activity 2)
- Print off or draw a large student seafood choice poster to hang on the classroom wall
- Print off pictures off all the species so that they fit into the seafood choice poster

In-class instructions:

- Divide students into 5 groups (4 students per group). Each group selects one student to be the waiter, the 3 others are diners at a restaurant
- Each group receives:
 - 1 menu
 - 1 student seafood choice card
- Explain that the cards list fish/seafood in 3 categories: (1) green: a good choice (sustainably caught), (2) orange: some conservation concern, (3) red: a bad choice (not sustainably caught). These categories are based on how 'responsible' the fishery is (i.e. not overfished, little bycatch and little habitat damage).
- Ask students to read their menus and decide as a group which appetizer and entrée they should order (they use their seafood choice card to help make their decision)
- After a few minutes, we will ask each group to place their order with the waiter. The waiter will bring a picture of their choice to the group on a plate, and ask the group to place it in the right category on the large seafood choice poster (See Table below).

Green	Orange	Red
Dungeness crab	Pacific cod	Atlantic cod
Imitation crab (pollock)	Alaskan king crab	Russian king crab
Herring	Pacific halibut	Atlantic halibut
Sablefish	Mussels	Orange roughy
Shrimp/prawn (trap caught)	Squid	Shrimp (trawl caught)
Sardine	Lobster	Shark
Fish sticks (pollock)	Yellowfin tuna	Swordfish
Pacific hake	Pacific wild salmon	Bluefin tuna

Closure Discussion

End with a brainstorm session on marine products that the students eat (seaweed, fish, seafood etc.). They can look up their favorite dish on the adult seafood choice card to see if it come from a sustainably fishery. Encourage students to share what they learnt today with their family and friends. Send students home with seafood wallet cards for their family.

Extension

Make sustainable sushi in the class. Brainstorm on marine products that we eat (seaweed, fish) and teach students how to make sushi with responsibly caught seafood.

References

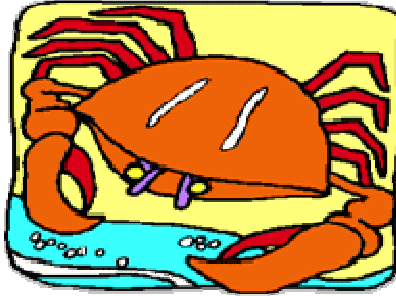
1. FAO, General Situation of World Fish Stocks, United Nations Food and Agricultural Organization (FAO). <http://www.fao.org/newsroom/common/ecg/1000505/en/stocks.pdf>
2. SeaChoice, Healthy Choices, Healthy Oceans. <http://www.seachoice.org/>



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3. What's troubling our waters: Habitat damage along our coast and under the water (Seafood Watch, Monterey Bay Aquarium). http://www.mbayaq.org/cr/cr_seafoodwatch/sfw_hd.asp
4. How fish are caught or farmed – fishing methods (Seafood Watch, Monterey Bay Aquarium). http://www.mbayaq.org/cr/cr_seafoodwatch/sfw_gear.asp#trawling

Menu 1



APPETIZER I

Dungeness crab cakes

APPETIZER II

Shark Fin Soup

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ENTRÉE I

Russian king crab with garlic butter

ENTRÉE II

Fish sticks with french fries

Menu 2



APPETIZER I

Steamed mussels in a tomato sauce

APPETIZER II

Shrimp cocktail (trawl caught shrimp)

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ENTRÉE I

Grilled sardines with roasted potatoes

ENTRÉE II

Steamed lobster with garlic butter and rice

Menu 3



APPETIZER I

Sushi: California rolls with imitation crab

APPETIZER II

Calamari with a lime dipping sauce

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ENTRÉE I

Grilled bluefin tuna with salad

ENTRÉE II

Pacific cod fish and chips

Menu 4



APPETIZER I

Atlantic cod cakes

APPETIZER II

Smoked Pacific salmon on crackers

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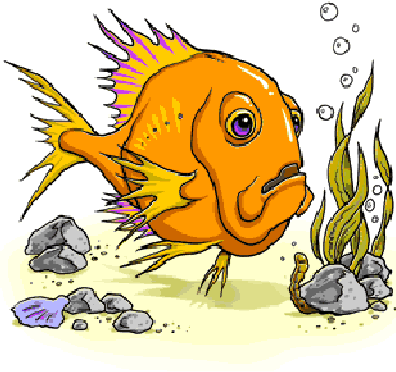
ENTRÉE I

Seared sablefish with green beans

ENTRÉE II

Grilled swordfish with rice

Menu 5



APPETIZER I

Trap caught prawns sautéed in butter

APPETIZER II

Yellowfin tuna sushi with soy sauce



ENTRÉE I

Grilled orange roughy with asparagus

ENTRÉE II

Grilled pacific halibut with mixed vegetables

Menu 6



APPETIZER I

Grilled herring with spicy dipping sauce

APPETIZER II

Barbequed Atlantic halibut on skewers

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ENTRÉE I

Steamed Alaskan king crab legs with lemon rice

ENTRÉE II

Baked pacific hake fillets in a savory sauce with potatoes

Seafood Guide

Best Choice	Some concerns	Avoid
Dungeness crab	Pacific cod	Atlantic cod
Imitation crab: polluck	Alaskan king crab	Russian king crab
Herring	Pacific halibut	Atlantic halibut
Sablefish	Mussels	Orange roughy
Shrimp (trap caught)	Squid	Shrimp (trawl caught)
Sardines	American lobster	Shark
Fish sticks: polluck	Yellowfin tuna	Swordfish
Pacific hake	Pacific salmon	Bluefin tuna