Fishing for the future

**Summary**

Hawaii loves seafood! Ahi, opihi and limu are just some of the favorite seafood items that are caught, collected and gathered in Hawaiian waters of the Pacific Ocean. In this lesson students will learn how to follow the Hawaii State fishing regulations and methods on how to properly catch and measure important fish and invertebrate species. Before they can measure the organism they must be able to identify major body parts that will be measured for example: fish measurements are taken in fork lengths, this is the measurement from the tip of the fishes mouth to the fork in the inside of the tail.

**Objectives**

- Students will learn how to measure fish and invertebrates
- Students will be able to use the Hawaii state fishing regulations pamphlet to determine the legal sizes and bag limits of certain species
- Students will be able to research an important ocean species to find out its common, scientific and Hawaiian names
- Students will be able to explain the importance of marine protected areas (MPAs) and fishing regulations

**Materials**

- Hawaii state fishing regulations (print one copy)*
- Seafood watch pocket guides (one for each student)*
- Net or bucket (one)
- Ruler (one for each student)
- 8 x 11 Poster paper (one for each student)
- Index cards (one for each student)

*available online or by request will be sent to your school

**Making Connections**

This is the final lesson of the ocean exploration curriculum which involves a final student project and a homework activity. It is designed to tie in a closing message as to why it is important to protect our ocean resources and how we can protect them for the future.
Teacher Prep for Activity

1. Print one copy of the Hawaii State fishing regulations (this will be enough for 30 students)
2. Cut out the regulated ocean species and glue them to an index card
3. Place them in a net or bucket
4. Write on the board “Fishing for the future”
5. Print out Seafood watch pocket guides (one for each student)

Background

In ancient Hawaii there were kapus or laws that regulated when and what type of ocean organisms could be gathered for food. Today, we still have laws that enforce and regulate how much and when we can fish, pick and gather food from the ocean. The Hawaii Department of Land and Natural Resources has developed fishing regulations to best manage fish and invertebrate populations. Size regulations are set to protect species that haven’t reached maturity yet, as fish get larger they are able to produce more eggs. The closed seasons are set to protect species from being removed while they are spawning.

The mission of the Division of Aquatic Resources is to manage, conserve and restore the state's unique aquatic resources and ecosystems for present and future generations. In Marine Protected Areas (MPAs) at least some of the organisms receive some level of protection. There are two types of MPAs in Hawaii, Marine Life Conservation Districts (MLCDs) and Fishery Management Areas (FMAs).

Vocabulary:
(see attached diagrams of how to measure a fish or invertebrate)

Carapace length: the distance from the ridge between two largest spines above eyes to rear edge of carapace.

Department of Land and Natural Resources (DLNR): manages the state’s natural and cultural resources. DAR and DOCARE are branches of DLNR.

Department of Aquatic Resources (DAR): The DAR manages the state's aquatic resources and ecosystems through programs in commercial fisheries and resource enhancement; aquatic resources protection, habitat enhancement, and education; and recreational fisheries. Major program areas include projects to manage or enhance fisheries for long-term sustainability of the resources, protect and restore the aquatic environment, protect native and resident aquatic species and their habitat, and provide facilities and opportunities for recreational fishing.

Division of Conservation and Resources Enforcement (DOCARE): is responsible for enforcement activities of the Department of Land and Natural Resource. DOCARE enforces all State laws and rules involving State lands, State Parks, historical sites, forest reserves, aquatic life and wildlife areas, coastal zones, Conservation districts, State shores, as well as county ordinances involving county parks.
Bag Limit: a law that restricts the number of animals taken within a specific species or group for a given amount of time.

Fish Management Area (FMA): a type of marine protected area (MPA) that is managed with rules and regulations to help sustain marine life with specific fishing rules.

Fork length: the straight-line distance from tip to snout to middle of trailing edge of tail.

Kapu: Hawaiian word for forbidden, in ancient Hawaii kapu refers to the ancient system of laws and regulations. Certain fishes and or areas were designated kapu to help manage and conserve ocean resources.

Marine Life Conservation District (MLCD): a type of marine protected area (MPA) that is managed with rules and regulations to help sustain marine life and nearshore habitats.

Marine Protected Area (MPA): a protected ocean area that has specific rules and regulations that determine the human uses of the area.

Sustainability: the ability to live and utilize resources without depleting them, using them at a rate that allows replenishment and reproduction to occur to help ensure long-term survival and abundance of species.

Tail width: the measurement between the first and second abdominal segments (slipper lobster).

Width: the widest part of the carapace (used with Samoan and Kuahonu crab).

Procedure
Before the lesson, have a class discussion and give the kids two homework assignments (homework is an optional part of this lesson).

Ask the class how many students eat seafood, then ask them to keep their hand up if they or someone in their family collects or fishes for their seafood sometimes.

Pass out the sustainable seafood pocket guides.

Homework #1:
Ask the students to describe in a short essay what resources they or their family collect/fish/gather from the ocean, include the methods and how often they do this. Emphasize that they should be specific. What species do they get? What is the common/scientific/Hawaiian name for them?

For example: Every Saturday my mom and I collect Limu at low tide, we collect Limu Kohu and Limu Ele ele. I am not sure what the scientific or common name is for these. We rinse it and then when we get home we mix it in with our soups and stews to add flavor.

Homework #2:
Have each student take the Seafood watch pocket guide home and put it on the refrigerator. Ask them to keep track for two weeks of how many items they eat certain fish/seafood off the list and
how often. If it is not on the list (for example a reef fish) still record it. * you may choose to make this a month long assignment.

Once the students have recorded their two-week seafood consumption have them tally up their results as a class. What was the average amount of days that students consumed seafood over the two weeks? What was the most commonly eaten seafood item? Have them make charts and tables to represent their results and be able to discuss where the items are on the seafood watch guide and should they consider eating any substitutions?

For the lesson go over the following with the class:
1. The vocabulary
2. The fishing regulation booklet (if available) or just print off the internet
3. Have students review Pages: 14, 26-38, 29, and 58.
4. Go around the class with the bucket/net and have each student pick out an ocean animal
5. Pass out the poster paper
6. Tell the students that they will use the poster paper to draw their ocean animal to the minimum regulation size and also include a notecard with research information.
7. Have students research their ocean animal using the Hawaii state fishing regulations, the internet and other books on Hawaii ocean animals.
8. Suggested information that they should gather for their research poster: Common name, Scientific name, Hawaiian name, minimum size regulated, bag limit (if any), closed season (if any), how they would collect it: including the depth that it lives, ocean zone that it is commonly found in, method of fishing/collection, how it is used in Hawaii (cooked, eaten raw, medicine, etc.)

**Assessments**
Completed research poster
Completed homework assignments #1 and #2 (optional)

**Resources**
Hawaii state fishing regulations can be picked up at your local Department of Land and Natural Resources (DLNR) office
or can be downloaded off the Department of aquatic resources (DAR) website:
http://hawaii.gov/dlnr/dar/regulations.html
The DLNR office also has educational posters available for teachers that include information on fish, pelagic ocean animals, sharks, fishing regulation sizes. The DOCARE officers are also available for classroom visits.

The pocket guide to eating ocean friendly seafood is available online for each region (including Hawaii)
The website also has great information on ocean issues (bycatch, aquaculture, habitat damage, overfishing) and why it is important to select certain species to eat and support sustainable seafood.
http://www.montereybayaquarium.org/cr/cr_seafoodwatch/download.aspx

**Extension Activities**
Have the students play a “go fish” type card game using the fish for the future cards. Put cards in a bucket or a net and have the students decide if they can catch and keep or release.

Invite the DOCARE officer to visit the classroom as a guest speaker.

**Diagrams for how to measure a fish or invertebrate (DAR)**