

Source: **Coral Forest Teacher's Guide.** Coral Forest, 400 Montgomery Street, Suite 1040, San Francisco, California 94104 Tel: (415)788-REEF Fax: (415)398-0385 e-mail: coral@igc.apc.org Used with permission.

47*. FISHY PROBLEMS

Objective:

Students gain a greater understanding of the problems facing coral reefs and native coastal people by calculating the answers to the questions on the following page.

Interdisciplinary Index: Math

Materials:

TABLE OF EQUIVALENTS

1 kilogram = 2.205 pounds
1 metric ton = 2,204.623 pounds
1 kilometer = .621 miles
1 mile = 5,280 feet

one **Fishy Problems** handout per student

Presentation:

1. Discuss the various anthropogenic threats affecting coral reefs and the native coastal people dependent upon them for survival.
2. Distribute a copy of the **Fishy Problems** handout to each student and have them answer the questions.
3. Discuss the answers with the students and their feelings about the impact these situations are having on the environment., people, local and global economies, etc. What solutions might they recommend? Emphasize that all of the questions are based upon actual scientific information.

FISHY PROBLEMS

Questions:

1. The world's oceans are fished by over one million large fishing ships and two million smaller ones. Around the world, 12.5 million people make their living catching fish, and another 150 million people are employed in on-shore operations or the processing of fish.
 - a) How many ships fish the world's oceans?
 - b) For every single fishing boat, how many people are needed, on the average, to catch fish?
 - c) For every single fishing boat, how many people are needed, on the average, to handle on-shore fishing operations and processing?
2. "Almost all tuna stocks worldwide are in peril from overfishing, with the Atlantic bluefin tuna declining 90 percent in the last two decades, from 225,000 in 1970 to only _____ In 1990."

3. Shrimpers off the southern coast of the United States catch approximately 48,000 endangered sea turtles a year. It is estimated that one quarter of these are killed in the shrimp nets. How many turtles are killed each year?
4. In a coral reef area near Santiago Island in the Philippines, observers recorded 6 dynamite fishing explosions per hour, with an estimated catch of 1800 kg of fish per day.
 - a) Assuming there are eight hours in the fishing day, how many dynamite explosions occurred in one day?
 - b) How many kg of fish on the average would have been caught after each explosion?
 - c) How many pounds of fish would have been caught in a day?
 - d) How many pounds caught in one hour?

Surveys indicated that more than half of the corals in that area had been killed by the dynamite blasting.

5. In the Maldives, a coral reef was destroyed which caused increased erosion of the beach and loss of sand. This could have the disastrous effect of increasing the loss of life and property during storms, decreasing income from tourism, and harming habitat. As a result, the government spent \$12 million for 1 km of seawall to replace the destroyed reef.
 - a) How many feet long was the seawall?
 - b) What was the cost per foot to build?
6. It is important to consider the economic value, both short term and long term, of environmental conservation. However, often this is not done. For example, in the Philippines a logging concession was expected to yield \$13 million from cutting down the rainforest over a 10-year period. The resulting environmental problems, such as erosion and siltation, would have severely damaged the adjacent coral reefs where fishing was done. If this had happened, it was estimated that up to \$75 million in fishing revenue would have been lost. If this logging concession had been granted, what would have been the net loss of revenue?
7. In the Philippines, it is estimated that 1 square kilometer of coral reef in poor condition produces only 5 metric tons of fish per year, just enough to feed 100 people. A healthy reef, however, can feed between 400 to 700 people per year.
 - a) How many metric tons of fish would be produced by a healthy reef?
 - b) How many pounds of fish would this equal?
8. At a conservative estimate, coral reef destruction in the Philippines has meant a loss of 37% in fish production each year, or 159,000 metric tons.
 - a) If the coral reefs were healthy and fish production was at 100%, how many metric tons of fish would be produced?

This 37% loss means that 3 million people now get no seafood protein, or 6 million people get only half the protein they need.

- b) How many pounds of fish does each of these people now eat in a year?

Correlation to National Standards from McREL (<http://www.mcrel.org>) :

Life Sciences

6. Understands relationships among organisms and their physical environment

Geography

8. Understands the characteristics of ecosystems on Earth's surface
14. Understands how human actions modify the physical environment
16. Understands the changes that occur in the meaning, use, distribution and importance of resources

Mathematics

3. Uses basic and advanced procedures while performing the processes of computation