



Cabrillo Marine Aquarium Lesson Plan

Grade Level: Third and Fourth Grades

Title: How Harmful is Marine Debris?

Objective: Students explore the effects of marine debris on animals, people, and vessels

California Science Standards: 3rd: 3c, 5b, 5c, 5e 4th: 3b, 6a, 6e

Time to Complete: 30 minutes to complete worksheet; 30 minutes (preferably the next day) to analyze and discuss results

Materials Provided by CMA: *Worksheet: How Harmful Is It?*, (the following items only provided with CMA's Ocean Discovery Kit: *Photo: Lobster/Crab Trap* examples of different types of debris to be discussed: Fishing Line, Six-Pack Ring, Resin Pellet (Nurdles), Section of a Fishing Net)

Materials Provided by Teacher: Copies of the "How Harmful Is It?" worksheet for each student or group of students, Paper Cup, Plastic or Trash Bag, Broken Glass Bottle (CAUTION – use care when handling this material)

Vocabulary: ghost fishing, medical waste, marine debris, harmful, wildlife, vessels, motor boat, kayak, jet ski, sailboat, sandy beach, kelp forest, mussel bed, open ocean, salt marsh

Lesson Outline: Students complete a form that requires them to make decisions about how severely different types of marine debris affect animals, people, vessels, and habitat. As a class, results are totaled and analyzed to determine which types of marine debris are most harmful to the different categories.

Lesson Procedures:

1. Distribute the "How Harmful Is It?" worksheet to the class (either each individual student or have them work in groups). Make sure students are familiar with the types of debris presented in the worksheet. If possible, label and display examples of the actual debris or use sample debris images provided at the end of this lesson. Review with students the instructions at the top of the handout. Then have students complete the table.
2. Collect handouts and calculate class subtotals for each type of debris on the handout (add together the students' subtotals and divide by the number of students in the class). NOTE: You can do this with the class or on your own and present the totals the next day. Pass back to students their original handouts.
3. Write the class subtotals on the board.

4. As a class, analyze the results of the worksheet. Initiate discussion by asking questions such as the following:
 - According to class results, which types of marine debris are most harmful to seals? Sea turtles? Seagulls? Which types of marine debris seem to be most harmful to animals in general? (Repeat this series of questions for people, vessels, and habitats.)
 - According to class results, which types of marine debris are the most harmful? Do you agree? Why or why not?
 - According to class results, which type of debris is the least harmful? Do you agree? Why or why not?
 - Are there any types of debris that received a low grand total, yet are harmful on the list? Which ones?
5. Discuss with students how their individual results might have varied from the class results. Help them to understand that people may have had different opinions about how harmful certain debris is based on their own attitudes and experiences.

The discussion also should introduce the concept that the abundance of certain types of debris may make them more harmful on a large scale than other types that appear to be more dangerous. For example, bottles and cans may be abundant forms of debris, but they are not as potentially harmful as other forms of debris such as discarded fishing line and abandoned nets. One fishing net can continually maim or kill unsuspecting wildlife, while a hundred soda cans on the beach are primarily an eyesore and will not intentionally harm marine and coastal animals and communities.

NOTE: The numbers that students arrive at by doing this exercise do not represent objective data on marine debris effects. Instead, they help students explore the many ways that debris can harm the different components of marine and coastal communities. Students should come away with the knowledge that certain types of debris may have a greater effect on specific animals, people, vessels and habitats, but that almost all marine debris can be harmful to these different communities.

Lesson Extensions:

- Have students color in bar graphs to show the grand total for each marine debris item. Students can use their own grand totals or use the class average of the grand totals.
- Have students design a “Most Wanted” poster for the type of marine debris that they think is the most dangerous. The poster should include an illustration of the debris and list some of its “crimes.” Students might also mention a “reward” on the poster for the person who finds this type of debris and disposes of it properly or identifies it to the proper authorities for disposal.

- Have students find articles and papers about marine debris written by scientists, and compare the data in these publications with the results from the class exercise. Have the students compare and contrast the two sets of information, and indicate what they found most interesting from the scientific publications about marine debris.
- **Clever Catch Ball! (see handout in Background section of Binder for Game Rules and Answer Sheet)**
WARNING: plan ahead, it takes several minutes to pump up the catch balls
 - Have students learn while also having fun with the **Green Earth Clever Catch Ball.**

References:

- NOAA Turning the Tide on Trash
<http://marinedebris.noaa.gov/outreach/pdfs/101turntd.pdf>
- NOAA's Marine Debris 101
<http://marinedebris.noaa.gov/>
- EPA's Marine Debris site
<http://water.epa.gov/type/oceb/marinedebris/index.cfm>