Marine Debris

Students will examine marine debris in the classroom, explore how debris accumulates in the ocean, examine the primary types of debris, and explore solutions to the issue. The second day of this lesson includes a clean up activity where students venture to an area of their community to collect debris both as a service learning activity and as a tool to examine solutions.

Companion Video
www.youtube.com/imakechange/
Select Video: Marine Debris

Features
Interview with Peter Winch
From Farallones Marine Sanctuary Association

Credits
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CA State Science Standard
Grade 6
5b Ecology
6c Resources
7 investigation Experiment
Grade 9-12
6b Ecology
7 Investigation Experiment

Funded by the National Oceanic and Atmospheric Administration's
Bay Watershed Education and Training Program (B-WET)
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**BACKGROUND**

Marine debris is a serious issue that affects our entire planet. It can be found on nearly every continent in coastal waters, estuaries, and bays, as well as in surface waters and on ocean floors. Marine debris is defined as any man made solid that either directly or indirectly ends up in our waterways and eventually in our oceans. Plastics and fishing nets are two of the largest concerns that are discussed, but microplastics are a bigger concern.

There are two sources of marine debris.

1. **Land-based sources**
   - littering, dumping, poor waste management
   - storm water discharge
   - land fill
   - extreme natural events

2. **Ocean-based sources**
   - fishing vessels
   - stationary platforms
   - cargo ships

There are many types of marine debris. Plastic is a major constituent of the debris found in the oceans. Lighters, balloons, water bottles, fishing nets, bags, and microplastics are only a few that affect aquatic life and sea birds. It is no secret that many dead birds have been found with bottle caps and lighters in their stomachs. Birds, such as the Albatross, ingest plastics mistaken as food. Since the plastics do not digest, animals feel full and stop eating resulting in poor nutrition and in some cases starvation. When an adult Albatross’ provides food to its young, plastics can be mistaken for food causing fledgling birds to die.

Similarly, turtles mistake plastic bags for jelly fish. They have special throats to help push the jelly fish down. When they ingest a bag instead, the bag gets caught in the throat and results in suffocation.

Microplastics are of great concern. Plastics break down, but never really go away. Plastics can also absorb toxic chemicals that, once ingested, can accumulate into animals and the food chain. Other types of marine debris of concern include glass, rubber, fishing gear, old vessels, and metals.
Marine debris has many impacts on our planet:

- Habitat Damage
- Wildlife Entanglement
- Ingestion
- Vessel Damage/Navigational Hazards
- Alien Species Transport
- Ghostfishing
- Economic Impact
- Human Health and Safety
- Aesthetics/Eyesore

For an in-depth look, visit the National Ocean and Atmospheric Administration’s marine debris site at:

http://marinedebris.noaa.gov/marinedebris101/impacts.html

Once debris is in the ocean, it is transported via ocean currents and winds. This enables researchers to determine the sources of the debris. This also creates something now termed a garbage patch. These “patches” are areas in which debris accumulates due to currents, and mostly consists of plastics.

Here are small changes on an individual level that can create significant impacts to lower marine debris:

- Do not litter!
- Reduce, Reuse, Recycle
- Use reusable containers/bags
- Dispose of trash properly
- Be a conscious consumer
- Purchase recycled materials
- Limit use of disposable products
- Properly stow and secure equipment at sea
- Participate in fishing gear incentive programs
Overview

1. Hand out the questions that accompany the SF-ROCKS video. Go to www.youtube.com/user/imakechange and select the “Marine Debris” video.

2. Play the video while students answer questions.

3. After the video, discuss what they have learned and have them come up with ways to help this cause.

4. Service learning project: clean-up activity.

5. Analyze debris from clean-up graphically.

6. Propose solutions based on analysis.

7. Encourage students to Take Action in your community.

SET-UP

1. Print out and make copies of the questions that accompany the SF-ROCKS Video.

2. Find a “clean-up” in your area. If there is not a clean-up near you, organize a trip to a local park or waterway (stream, river, or estuary). http://www.coastal.ca.gov/publiced/ccd/ccd2.html http://www.oceanconservancy.org/our-work/marine-debris/international-coastal-clean-up-11.html

3. If there is a clean-up near you, there may be a waiver form. Be sure to print it out and make copies for the students.

4. If you are conducting your own clean-up, predetermine a place to dispose of the collected garbage.
PROCEDURE

**Day 1**

1. Ask students the following questions:
   - “What is marine debris?”
   - “Where does it come from?”
   - “Is it a problem? Why or why not?”

2. Tell students that they are going to watch a video on marine debris.

3. Hand out the question sheet to accompany the Watershed Video Project video, Marine Debris.

4. Show the video on marine debris.

5. Have students complete the video questions as they watch the movie.

6. Following the video, have an open classroom discussion about the video questions.

7. On the board, make a list of the ways each individual can make a difference. This list should include ideas mentioned in the background.

8. Inform students about the cleanup and ask, “What kinds of trash or debris might we find tomorrow?”

9. Let students know that they will collect trash if they would like to bring gloves. Alternatively, provide gloves.

**Day 2**

1. Introduce cleanup activity
   “Today we are going to clean up the __________. We’re going to collect trash to prevent marine debris. It is also really important for us to collect data so we can make a record of what is being improperly disposed of. This will also help us to look at ourselves and figure out ways that we can make a difference.”

2. Collect any necessary paperwork.

3. With your students, create a way to catalog the trash collected into categories (size, origin, use).

4. If your class is joining a cleanup, they should instruct participants on what they are collecting.
5. If you are conducting your own clean-up, remind the students what types of things they should be collecting: anything man made.

6. Hand out bags, gloves (optional), and data collecting materials.

7. Have students collect as much as they can for as long as they can.

8. If conducting your own clean-up, take trash with you to designated disposal drop.

9. Once back in the classroom, have the students make a graph with information collected during the clean up.

10. After graphs are constructed, discuss trends found in the data.

11. Discuss solutions to the primary trends.

**Assessment**

As a homework assignment, have the students write a 1-3 page paper addressing the following:

Consider the garbage that you and your classmates collected. Referring to your graph, what were the most common things you found? Who, or what, might be impacted by the debris you collected and how? What can and will you do to be a part of the solution instead of the problem?

**Extensions**

**Create Informative Posters:** ask students to create posters about the experience and proposed solutions to local debris. Display the posters at school or hold a poster event.

**TAKE ACTION!**

Implement solutions proposed by students.

Conduct an annual or biannual services learning clean-up of your local waterway.

If you don’t have a recycling program, start one in your school, community center, or church.
Marine Debris

As you watch Marine Debris answer the following questions:

1. What is Marine Debris and where does it come from?

2. Why are we concerned?

3. How does marine debris get to the ocean?

4. What are some things we can do to solve the problem?