

North American Marine Environment Protection Association®



2014 Lloyd's List Awards ENVIRONMENT AWARD WINNER



An Educator's Guide to Marine Debris



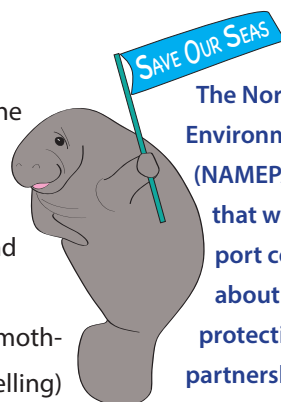
AN EDUCATOR'S GUIDE TO MARINE DEBRIS

Introduction

Marine debris is a problem that plagues coastlines around the world. In the past, it was considered primarily an eyesore. Today, through research, we know how seriously marine debris impacts marine habitats, marine wildlife, human health and safety, navigation and the economy.

Plastic bags, abandoned fishing nets and other debris can smother sensitive coral reef habitats as well as benthic (bottom-dwelling) ecosystems. Each year, many marine mammals, birds, and other organisms become entangled in or ingest various forms of debris. Fishing and shipping industries are also impacted by marine debris, as they pay vessel repair costs and must replace any damaged gear to continue working. In addition, coastal communities spend millions cleaning up their shorelines every year.

Despite its prevalence, marine debris is a problem that each individual citizen can help prevent. Education is the first crucial step in mitigation. Through the use of this guide, we can help foster environmental stewardship and create advocates for the marine environment. With every person that participates in a cleanup, uses a reusable bag or water bottle, or spreads the word about marine debris, we move one step closer to creating a more beautiful and healthy marine environment. *Source: NOAA, 2007*



The North American Marine Environment Protection Association (NAMEPA) is an industry-led organization that works to educate seafarers, port communities and students about the need and strategies for protecting the marine environment. In partnership with the National Oceanic and Atmospheric Administration (NOAA), NAMEPA has created *An Educator's Guide to Marine Debris* to provide educators with a tool to help students become more informed on marine debris and encourage environmental stewardship.

This easy-to-use guide is designed to provide maximum flexibility for educators in both formal and informal settings. It may be used as a standalone teaching tool, or to supplement lessons in other areas. This guide includes information about marine debris and useful lessons for students grades K-12, with a focus on STEM (Science, Technology, Engineering, Mathematics) objectives.

This guide is based on NOAA's "Turning the Tide on Trash: A Learning Guide on Marine Debris" and was published in 2014. To access presentations referenced in this guide and for additional information, visit www.namepa.net/education or our junior website, www.namepajr.net. We hope to continue to update this guide with new lessons and resources.





Acknowledgements

This learning guide is a collaborative effort between the North American Marine Environment Protection Association (NAMEPA) and the National Oceanic and Atmospheric Administration (NOAA). It was created using content from the “Turning the Tide on Trash” marine debris curriculum developed by NOAA.

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Trash Tracker

Grade Level: High School

Time: 1-2 weeks (time may vary)

SUMMARY

After a short PowerPoint presentation about disposable culture and marine debris that includes actual products (packaging, water bottles, etc.), students examine their own lives to see what they're throwing away. Using the NAMEPA Trash Tracker form, students record their waste for two weeks (time may vary). The first week, students record the items they throw away without changing their normal behavior. The second week, students attempt to reduce the waste they throw away and compare their data from each week. This lesson gives students insight into what they are most commonly throwing away and encourages them to reduce their waste.

OBJECTIVES

- Learn about the connection between disposable culture and marine debris
- Record items thrown away for 2 weeks using the Trash Tracker form (time may vary)
- Compare data from first week to second week and analyze what is being thrown away and determine how to best reduce waste

STEM APPLICATIONS

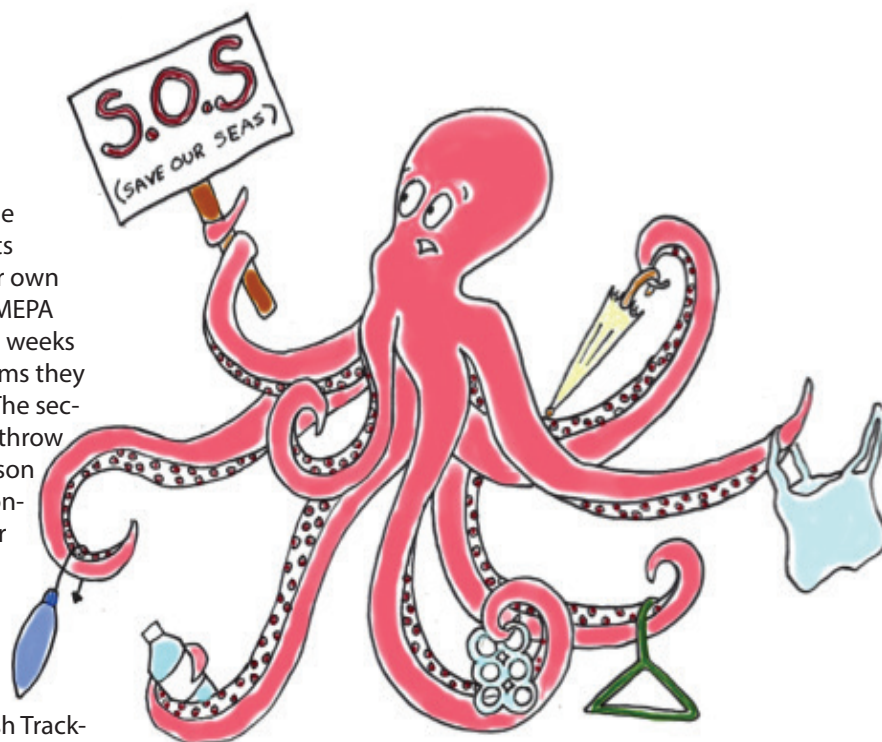
- Learn about marine debris, disposable culture and single-use plastics (Science, Technology)
- Record trash items thrown away and analyze data (Math)
- Discuss ways to reduce plastic consumption and prevent waste from becoming marine debris (Science)

VOCABULARY

- **Marine debris:** 'Any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes' (NOAA, 2007)
- **Municipal Solid Waste:** Trash or garbage generated by people on a daily basis – does not include agricultural, industrial, etc.
- **Per capita:** Per person

MATERIALS

- PowerPoint Presentation (on NAMEPA website)
- Examples of common trash items (optional)
- NAMEPA Trash Tracker Form
- Calculator
- Print outs of the data sets being used



Background

Marine debris is a global problem that causes our oceans and waterways to become clogged with human trash. Marine debris is a major issue that has detrimental impacts on humans, animals, and ecosystem health, as well as the economy. It is believed that marine debris mostly consists of plastics, though the #1 most collected type of debris is cigarette butts and filters. The debris starts as trash that is either littered (onto land or in the water) or improperly disposed of (possibly a trash can knocked over or not covered, falls out of garbage truck, blown away from landfills, etc.) that usually makes its way into storm drains and streams and is carried through rivers to the oceans. Other marine debris comes from abandoned fishing gear at sea.

One step to reducing marine debris is increasing our rate of recycling. Not only does recycling decrease the amount of raw petroleum we need to create the products that we use in our daily lives, but it decreases the amount of plastic entering our landfills and trash incinerators. Reusing as much material as we can and avoiding single-use plastics (plates, eating utensils, water bottles, straws, diapers, wrappers, packaging) also reduces the amount of trash that can potentially become marine debris.

ACTIVITY

1. Engage (20 min):

Before presenting the PowerPoint, begin the lesson by asking the students what types of items they most commonly throw away. How much of these items are renewables? Open the PowerPoint and present to the students about how our “throwaway culture” affects marine debris. If you brought in examples of common trash items, show them to the students. How many of the students use these items on a daily basis? Do the students recycle these items? Finish the PowerPoint presentation and take any questions the students may have.

OPTIONAL EXTENSION (20 min)

A great way to make students really think about disposable culture and all of the things we throw away is to show them the “Story of Stuff” video (storyofstuff.org). The whole video is about 21 minutes long, however you can choose to show a portion of it. The link is available on the NAMEPA website and is in the PowerPoint presentation. This video discusses the supply chain and how our “stuff” goes from extraction and production to being thrown away. Instead of the supply chain being a “closed loop,” it’s a linear system from beginning to end, which is not sustainable on a finite planet (this is a great point to stress!). We live on a planet that has cyclical systems that never create any “waste.”

3. Explain (5 min):

Hand out a Trash Tracker form to each student, and tell them they are going to be recording what items they throw away for the next week. Tell them to go about their daily lives as they normally would and not change their current behaviors, making sure to keep track of their waste.

At the end of that week, hand out a second form to each student, and this time ask them to make an effort to reduce the amount of trash they are throwing away, and record all the items thrown out.

4. Explore (20 min):

At the end of the second week, the students should total all of the items they’ve thrown away for each week and calculate what percentage of their waste for each week was made up of renewables vs. non-renewables. What changes did they see from week to week? Have them discuss with their peers and select students to share with the class.

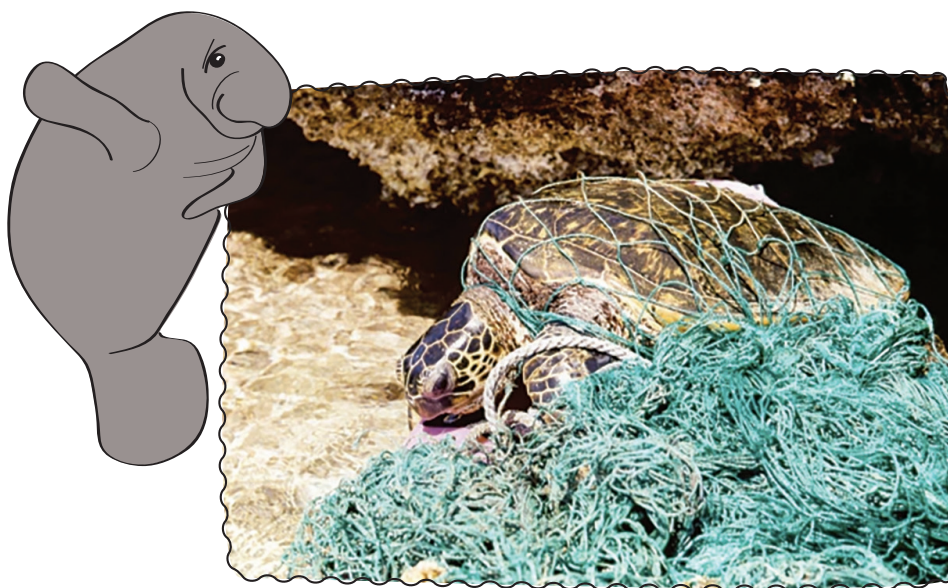
5. Evaluate/Wrap-Up (5 min):

Briefly review the main point from the lesson – Americans are using more and more plastic and very little of it is being recycled. Litter, trash blown from wind, and other improperly disposed garbage is carried to the oceans and poses a serious threat to animals, humans, ecosystems and economies. What other ways can we go about reducing our waste? What role do you think technology will play in helping us to decrease our waste?

DIVE DEEPER

For additional information about NAMEPA’s educational programs and materials, visit www.namepa.net/education.

NOAA’s Marine Debris website: marinedebris.noaa.gov.



Did you know that at least 115 marine species are impacted by entanglement, including mammals, turtles, birds, fish and crab?

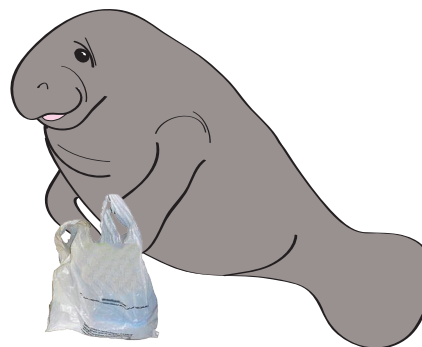
Trash Tracker

DATE									TOTAL
	NUMBER OF ITEMS								
Recyclables									
Paper									
Cardboard									
Aluminum Cans									
Steel Cans									
Glass									
Mixed Plastic									
Other									
								total number	
Compostable									
Food scraps									
								total number	
Trash Waste									
Food scraps									
Wrappers									
Other									
								Total Trash Waste	
								Total of Recyclables, Compost, and Trash	
								Percent of Renewable Material Tossed	



Trash Data Form

Record all trash items you find below using tally marks. Add up your totals at the end of each row.



MOST LIKELY TO FIND ITEMS	TOTAL	TOTAL
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Cigarette Butts:	_____	Beverage Bottles (Plastic):	_____
Food Wrappers:	_____	Beverage Bottles (Glass):	_____
Take Out/Away Containers (Plastic):	_____	Beverage Cans:	_____
Take Out/Away Containers (Foam):	_____	Plastic Bags:	_____
Bottle Caps (Plastic):	_____	Paper Bags:	_____
Bottle Caps (Metal):	_____	Cups & Plates (Paper):	_____
Lids (Plastic):	_____	Cups & Plates (Plastic):	_____
Straws/Stirrers:	_____	Cups & Plates (Foam):	_____
Forks, Knives, Spoons:	_____		

FISHING GEAR	TOTAL	TOTAL
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Fishing Buoys, Pots & Traps:	_____	Rope:	_____
Fishing Net & Pieces:	_____	Fishing Line:	_____

PACKAGING	TOTAL	TOTAL
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6-Pack Holders:	_____	Other Plastic Bottles:	_____
Other Plastic/Foam Packaging:	_____	Strapping Bands:	_____

OTHER ITEMS	TALLY	TOTAL
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_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____