LOGGERHEAD
MARINELIFE CENTER

Lesson:
Let's Talk Trash

Teacher Resource:

Human impacts, such as **pollution,** deforestation, and over-fishing, are accelerating at a rate that is faster than an ecosystem's ability to adapt to these changing conditions, leading to the extinction of some species. Although **conservation** efforts focus on preservation of these species and their habitats, currently, less than 1% of the world's ocean is protected by human-induced threats. **Marine debris** is one of the most severe human-impacts facing our ocean today. The variety of marine debris is virtually endless, as all drainage systems on land lead to the ocean. Therefore, even terrestrial material can make its way to the sea. All debris that ends up in aquatic environments can cause harm to marine life by way of ingestion, entanglement, constriction, and bioaccumulation in the form of **microplastics**. Despite its extensiveness, every citizen can help in prevention of marine debris in their everyday life by reducing their waste and use of single-use plastics.

Grade Level: Third - Fifth

Subject: Science

Duration: 30-45 minutes

Lesson Objectives

- I can recognize ways in which humans can impact the environment
- I can discuss environmental threats to organisms living in the ocean
- I can discuss ways in which the environment is changing and the effect on marine animals
- I can design a model to solve real-world issues, such as pollution

NGSSS Benchmarks

SC.5.L.15.1 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.
SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.
SC.4.N.1.8 Recognize that science involves creativity in designing experiments.
SC.35.CS-CS.1.2 Describe how models and simulations can be used to solve real-world issues in science and engineering.

Ocean Literacy Principles:
#6. The ocean and humans are inextricably interconnected.

Materials:
- LMC Trash Timeline Cards
- Campus Cleanup Activity (Save Our Seas Classroom Kit with materials available for rent at LMC)
- Beach Cleaning Contraption Activity supplies (recycled material, duct tape, markers, scissors)
- LMC Plastics in Your Home extension activity worksheet

Vocabulary:
- **Pollution**: Anything added to the environment that is harmful to living things
- **Conservation**: Using resources in a wise, responsible manner; protection of natural resources
- **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 Great Lakes
- **Microplastics**: Small plastic particles in the environment that are generally between 1-5 mm, or microscopic

Engagement (Pre-Lesson)

Introduce the students to marine debris, including how it gets to our oceans and how it is impacting our marine life by showing three, short *Trash Talk* Informational videos created by the NOAA Marine Debris program.

Video 1: What is marine debris? (2:06)
https://oceantoday.noaa.gov/trashtalk_whatismarinedebris/welcome.html

Video 2: Where does marine debris come from? (2:02)
https://oceantoday.noaa.gov/trashtalk_wheredoesmarinedebriscomefrom/

Video 3: Impacts of marine debris (1:33)
https://oceantoday.noaa.gov/trashtalk_impacts/welcome.html

Begin a short class discussion, asking questions such as: What are examples of marine debris? How does marine debris reach our oceans? What is at least one impact marine debris has on our oceans?

Exploration (Core-Lesson)

Students will conduct a clean-up of the outdoor space on their campus in order to participate first-hand in a conservation strategy to help reduce pollution and positively impact the environment. They will then use that debris to complete the following activity.

Put a timeline on trash! Students will gain knowledge about decomposition of common trash items by using the trash found during their campus cleanup! Cut out the time cards and spread them across the room randomly on the floor. Give each student a trash item and give them a few minutes to go around the room and decide which time card reflects the decomposition time they feel suits their trash item. Determine who guessed correctly or incorrectly and move the incorrect groups to their correct decomposition time. Finish the activity by discussing which items could have been thrown away, recycled, or composted.

Submit your data! Put your debris data to use by filling out our Campus Clean-up Data form! The data will help us to understand what debris items are having the biggest impact on school campuses. Click the link:
https://docs.google.com/forms/d/e/1FAIpQLSfSu0yl7gG8vsMTAVOJBX9-K7mCFPQyKopOY-c8BJ2C7shv3Q/viewform?usp=sf_link

Explanation (Post-Lesson)

Beach Cleaning Contraption Activity

Students will use their imaginations in order to design their own original debris cleaning contraption/device to pick up trash. Encourage the students to be creative in their design, keeping in mind the type of debris their device will target. Have the students each bring in pieces of recycled material from home such as food boxes, plastic bottles, cans, etc. Have the students work together and use their recycled material to construct a model of a device that could be used to pick up or remove debris items from the environment.

Questions to consider: how the contraption will be used and what marine debris will the device target?

Extension

Plastics in your home!

Students will use the provided worksheet to do an inventory of how many plastic items are in their own home. This allows students to get a first-hand view of just how much plastic we use in our everyday life and how they can try to reduce, or eliminate, that item in their own home. Look closely! Plastics can also be found in the form of chemicals and fibers, called polyethylene and polypropylene, in everyday items such as clothing, utensils, cosmetics and personal-care items.

Evaluation

Answer the questions on the Exit Ticket (shown below).

Let's Talk Trash Exit Ticket

3rd Grade

Using the Biodegradation Rates Timeline sheet, which common household item takes the most amount of time to biodegrade?

a. Cotton cloth
b. Glass bottle
c. Rope
d. Newspaper

4th Grade

What is the correct definition of marine debris?

a. Anything added to the environment that is harmful to living things.
b. Small plastic particles in the environment that are generally microscopic.
c. An activity or action that generally helps an organism.
d. Any solid material that is disposed of or abandoned into the marine environment.

5th Grade

Write one paragraph explaining at least one impact of Marine Debris.

Resource: Save Our Seas Classroom Kit

Available for rent at Loggerhead Marinelife Center. To book, please contact reservations@marinelife.org

Save Our Seas Classroom Kit

Bring ocean conservation to your classroom by checking out this all-inclusive kit to help teachers talk about trash to their students! Interactive activities will ensure students take home the important concept of reducing the impact on marine life and our oceans. Kit includes: classroom presentation, NGSSS aligned lesson plans for grades **3-5** and **6-8**, all activity supplies, and a comprehensive marine debris class display.

Cost: $40 per week

Capacity: Unlimited

To book Debris-Free Seas Classroom kit, please contact **reservations@marinelife.org**

Put a Timeline on Trash!

Follow the directions outlined in the Exploration section of lesson for the Trash Timeline Activity.

BIODEGRADATION RATES	
Material	**Time Required to Biodegrade**
Paper Towels	2-4 weeks
Apple Core /Orange Peel (Add this in at the last minute. Do not store these in the plastic bag.)	2-4 weeks
Newspaper	2-4 weeks
Plain Cardboard (unwaxed)	3 months
Cotton cloth	3-6 months
Rope	1 year
Waxed Milk Carton	5 years
Cigarette	1-5 years
Disposable Diaper	10-20 years
Steel Can	80-100 years
Aluminum Can	200-400 years
Ziploc™ Bag	300 years
6-pack Ring	400 years
Plastic Bottle	450 years
Monofilament Fishing Line	600 years
Glass Bottle	Thousands to millions of years
Styrofoam™	????? Unknown

5 Years	600 Years
10-20 Years	Thousands to Millions of Years
80-100 Years	3 Months
300 Years	1-5 Years
400 Years	600 Years

Plastics in Your Home!

Directions: Take an inventory of all of the plastic you can find in your home. Look closely! Plastics can also be found in the form of chemicals or fibers (polyethylene or polypropylene) in everyday items.

Plastic Item	How many?

Choose one plastic item from your list. What are some ways in which you can reduce, or eliminate, this plastic from your home?