



Island STYLE



Trash's Travels



SUBJECT:

ELA

GRADE LEVEL:

6th

TIMEFRAME:

45 minutes

MATERIALS:

- Pencils
- Colored pencils
- Printer paper

TOP 10 ITEMS COLLECTED

1. CIGARETTE BUTTS
1,863,838
2. PLASTIC BEVERAGE BOTTLES
1,578,834
3. PLASTIC BOTTLE CAPS
822,227
4. FOOD WRAPPERS
762,353
5. PLASTIC GROCERY BAGS
520,900
6. PLASTIC LIDS
419,380
7. STRAWS, STIRRERS
409,087
8. GLASS BEVERAGE BOTTLES
390,468
9. OTHER PLASTIC BAGS
368,655
10. FOAM TAKE-AWAY CONTAINERS
365,584



ACTIVITY SUMMARY:

Students will create a concrete point of view story describing the travels of a piece of marine debris in the Galveston Bay Watershed and the Gulf of Mexico

LEARNING OBJECTIVES:

- Students will learn about what marine debris is and where it comes from
- Students will recognize the magnitude of trash currently in our ocean
- Students will learn about the structure of concrete poems and will create their own

ALIGNMENT:

Writing TEKS

- 6.5 (E) - Make connections to personal experiences, ideas in other text, and society
- 6.5 (I) - Monitor comprehension and make adjustments such as rereading, using background knowledge, asking questions, and annotating when understanding breaks down
- 6.5 (H) - Synthesize information to create new understanding
- 6.14 (E) - Revise final draft in response to feedback from peers and teacher and publish written work for appropriate audiences
- 6.15 (A) - Write imaginative stories that include: a clearly defined focus, plot, and point of view, a specific, believable setting through the use of sensory details, dialogue that develops the story
- 6.15 (B) - Write poems using: (i) - poetic techniques, figurative language, graphic elements

Ocean Literacy Principles:

- 1 Earth has one big ocean with many features
- 2 The ocean and life in the ocean shape the features of Earth

BACKGROUND INFORMATION:

Concrete Poems and Stories

A concrete poem is an arrangement of words on a page into shapes or patterns that reveal an image. Concrete poems are an artistic blend of the literary and the visual arts. Readers experience a concrete poem via its words, typography, and the visual representation of the subject of the poem. In this type of visual poetry, what the words mean and how they look are often equally important. Within the graphic space of their work, concrete poets also rely on color and typeface to further characterize the poem and image at hand.

According to the NOAA Marine Debris division the Gulf of Mexico has a productive, diverse, and beautiful coastline. However, marine debris is a threat to our ocean and waterways, that can affect navigation safety, the economy, and even human health. The NOAA Marine Debris Program is the federal government's lead for addressing marine debris, with a mission to investigate and prevent its adverse impacts.

Where does marine debris come from?

All marine debris comes from people. Most trash reaches the seas via rivers, and 80% originates from land through littering, poor waste management practices, storm water discharge, and extreme natural events such as tsunamis and hurricanes. Debris can also come from ocean-based sources, such as fishing vessels, stationary platforms used for offshore oil and gas, cargo ships, and other large vessels.

Marine debris in the Gulf of Mexico ranges from large concentrations of litter (i.e. cigarette butts and plastic bottles) that find their way through the storm drains to the beaches to large 190-foot derelict vessels that disturb marshes and seagrass habitats. The NOAA Marine Debris Program aims to prevent and reduce marine debris in the Gulf of Mexico through education, research, removal, and response to large debris events.

What are common types of marine debris?

- **Plastics such as single-use water bottles, grocery bags, food wrappers, and cigarette butts**
- **Microplastics (pieces <5mm) that are manufactured or come from the breakdown of larger pieces of plastic**
- **Derelict Fishing Gear**
- **Abandoned and Derelict Vessels**

The term 'garbage patch' is a misleading nickname for areas of the open ocean where man-made litter and debris accumulate. Although many believe that garbage patches are "islands of trash" that are visible from afar, these areas are actually made up of small plastic pieces, called microplastics, that are easily missed at first glance, or bundles of derelict fishing gear. This debris is always moving due to winds and currents, causing the garbage patches to constantly change size and shape. The items making up the garbage patches can be found from the surface all the way to the ocean floor.

Garbage patches are created from rotating ocean currents called gyres. These currents pull debris into a centralized location, forming 'patches' where marine debris accumulates. Although these patches exist around the world, the most well-known is the 'Great Pacific Garbage Patch,' located between California and Hawaii in the North Pacific Subtropical High. This patch is as big as Texas and it is estimated that it will double in size in the next five years.

What are the impacts of garbage patches?

Large accumulations of marine debris can threaten wildlife through entanglement, ingestion, and ghost fishing, and can be a hazard to ocean vessels by clogging engines and propellers. According to seaturtles.org, sea turtles are affected by plastic during every stage of their life. They crawl through plastic on the way to the ocean as hatchlings, swim through it while migrating, confuse it for jellyfish (one of their favorite foods), and then crawl back through it as adults. Thousands of sea turtles, whales, and other marine mammals, and more than 1 million seabirds die each year from ocean pollution and ingestion or entanglement in marine debris. Researchers have also estimated that for every 2.2 pounds (1 kilogram) of plankton in this area, there is 13.2 pounds (6 kilograms) of plastic.

Why don't we just clean up the garbage patches?

Cleaning up marine debris found in the open ocean is not as simple as it may sound. Cleaning the open ocean would be challenging for several reasons:

- **Things keep moving.** The areas where debris accumulates move and change throughout the year as wind and water currents shift.
- **They're really big.** These accumulations of debris are usually very large and debris is unevenly distributed from the surface of the water all the way to the ocean floor.
- **Most of the debris is tiny.** The garbage patches are composed mainly of microplastics, bits of plastic that are five millimeters or less in size. Because of their small size, microplastics can't be easily removed from the water column.
- **It would cost a lot.** Collecting and transporting marine debris from the open ocean to shore for disposal could be very costly. Resources can go much farther when removal is focused along the coast.

VOCABULARY:

- **Marine Debris** - Also known as marine litter, 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
- **Concrete Poems** - Poems that are written in an arrangement that forms a picture

PREPARATION:

Provide students with paper, writing materials, and colored pencils for decoration.

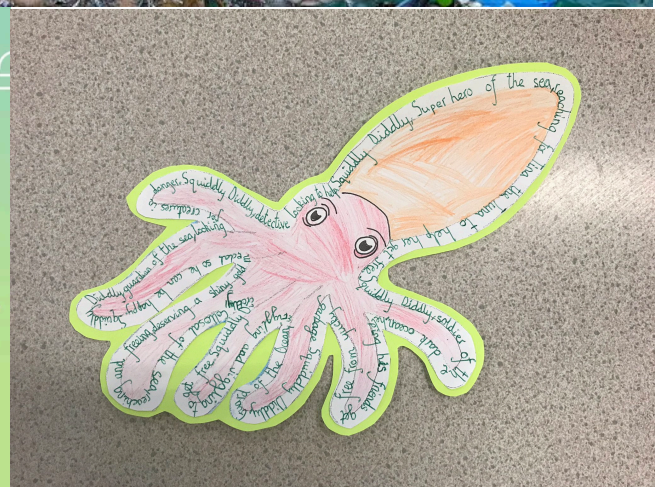
INTRODUCTION:

Have you ever found a message in a bottle? Have you ever thrown one out to sea? The idea is that the ocean currents will move that message along the coastline for someone else to find. Unfortunately, what you are actually doing is littering. Any trash that blows off the land near the Trinity River washes downstream and becomes marine debris in our Galveston Bay and eventually the Gulf of Mexico.



You will be writing from the point of view of one of these pieces of marine debris. Where did it start its journey? Who bought it? What purpose did it serve? How did it get separated from its original purpose? Where did it go? Who did it encounter along the way? Did it stay in one piece, or did it break up? The conclusion of your story should be how the piece of marine debris was removed from the ocean. Be descriptive and use all the academic and lesson vocabulary you have learned throughout this semester about the Galveston Bay Watershed and the Gulf of Mexico.

Now, draw the outline of the trash item you were writing about. You will write your completed point of view writing using this shape as your guide. This is often called concrete poetry because your words are arranged into shapes or patterns that reveal an image. Concrete poems are an artistic blend of the literary and the visual arts. In this type of visual writing, what the words mean and how they look are often equally important.



ASSESSMENT OF LEARNING:

Students will read their stories and display their artwork.

CLOSING:

As you teach lessons linked to our Galveston Bay Watershed and the Gulf of Mexico you can use the “I Wonder” board as a closure assignment. You might ask what else the students want to learn about marine debris. Students may ask about hurricane debris, or nurdles or if turtles really get straws stuck in their noses. All of their questions (even the ones asked multiple times) would go to the I Wonder board. If a question was answered in the lesson, it still goes on the board. Students may even have questions days later that could be added. The goal is to have a place for all questions about Galveston Bay and Gulf of Mexico to be housed.

EXTENSION:

3D Marine Debris Art Concrete Poem:

- Have students create an acrylic canvas painting of something marine themed (sea animal, marine bird, ocean view, etc)
- Have students write a Point of View poem to accompany the painting
- Have students collect trash (from the beach, from home, from the school yard, etc)
- Incorporate the trash items by hot gluing them to the acrylic painting
- Have students type and print out text to their poems, cut out the words/sentences, and glue them to the acrylic painting

NOTES:

<https://marinedebris.noaa.gov/gulf-mexico>

<https://marinedebris.noaa.gov/resources/fact-sheets>

<https://youtu.be/7c9mSVPXYxU> What is the Great Pacific Garbage Patch 2:12 by NOAA Marine Debris program

<https://youtu.be/FfSFKEM5Psc> What is Marine Debris 2:06 by NOAA Marine Debris Program

BACKGROUND INFORMATION:



Marine Debris

Marine debris is a global problem.

Marine debris is not only a pervasive threat to our ocean, Great Lakes, and waterways, but can affect navigation safety, the economy, and even human health. The NOAA Marine Debris Program (MDP) is the federal government's lead for addressing marine debris, with a mission to investigate and prevent its adverse impacts.

Where does marine debris come from?

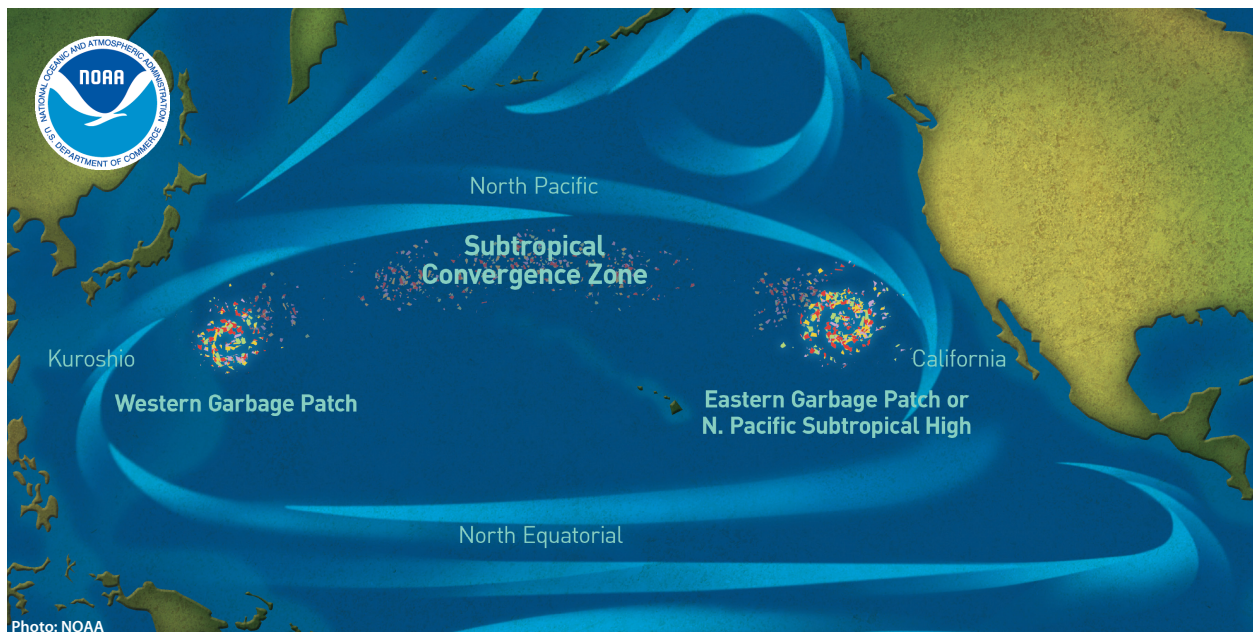
All marine debris comes from people. It can enter the ocean and waterways from land through littering, poor waste management practices, storm water discharge, and extreme natural events such as tsunamis and hurricanes. Debris can also come from ocean-based sources, such as fishing vessels, stationary platforms used for offshore oil and gas, cargo ships, and other large vessels.

What is 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.



BACKGROUND INFORMATION:



What are Garbage Patches?

The term 'garbage patch' is a misleading nickname for areas of the open ocean where man-made litter and debris accumulate. Although many believe that garbage patches are "islands of trash" that are visible from afar, these areas are actually made up of small plastic pieces, called microplastics, that are easily missed at first glance, or bundles of derelict fishing gear. This debris is always moving due to winds and currents, causing the garbage patches to constantly change size and shape. The items making up the garbage patches can be found from the surface all the way to the ocean floor.

Garbage patches are created from rotating ocean currents called gyres. These currents pull debris into a centralized location, forming 'patches' where marine debris accumulates. Although these patches exist around the world, the most well-known is the 'Great Pacific Garbage Patch,' located between California and Hawaii in the North Pacific Subtropical High.

What are the impacts of garbage patches?

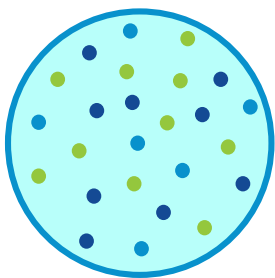
Large accumulations of marine debris can threaten wildlife through entanglement, ingestion, and ghost fishing, and can be a hazard to ocean vessels by clogging engines and propellers. More research is needed to fully understand the specific impacts of garbage patches on both humans and the environment.



Microplastic Marine Debris

What are Microplastics?

Microplastics are small plastic pieces or fibers that are smaller than 5 mm in size. They come in many forms including beads, fragments, pellets, fibers, and more.



Primary microplastics are made to be small and can come in the form of resin pellets and beads. Products like resin pellets are melted and used to create larger plastic items, while microbeads may be found in personal care products, such as toothpaste, face washes, and cosmetics.

Secondary microplastics come from larger pieces of plastics, such as beverage bottles, bags, and toys. Sun, wind, and waves can cause these plastics to become brittle and fragment into smaller and smaller pieces in the environment, though they may never fully go away.



Plastic microfibers are synthetic fibers, such as polyester or nylon, which are used to make clothing, furnishings, and even fishing nets and lines. Through general wear or washing and drying, fibers may break apart from larger items, creating secondary microplastics.



Photo: NOAA

Why are Microplastics a Problem?

Our ocean and Great Lakes are polluted with a wide variety of marine debris, ranging from large fishing nets and abandoned vessels, down to the smallest plastic particles that can't be seen with the naked eye. These microplastics are found throughout the ocean, from tropical waters, to polar ice, and even in fresh water and the air we breathe. Microplastics have also been found in tap and bottled water, sea salt, and other products we eat or drink.

Because they are so small, wildlife can mistake microplastics for food. Zooplankton, fish, mussels, and even whales have been found to ingest microplastics. The microplastics and chemicals in the plastics may impact the bodily functions of animals.

Microplastics can also carry harmful pollutants. They may absorb pollutants that are in the water around them, or leach chemicals that are added to plastics to make them colorful or flexible. Although wildlife may ingest or be exposed to these contaminants, more research is needed to understand how they might be affected.

BACKGROUND INFORMATION:



Photo: Heal the Bay

Marine Debris and the Economy

Marine debris is an eyesore along shorelines around the world. It can be dangerous for wildlife, damage sensitive habitats, create safety and navigation hazards, and impact the economy.

In the United States, the tourism and recreation sector is the largest employer in the ocean and Great Lakes economy. Marine debris littered on beaches degrades the beauty of the environment and may even prevent tourists from spending their time and money in coastal communities that rely on tourism. Local governments and volunteer organizations also spend limited resources to clean up.

Lost and derelict fishing gear can impact commercial and recreational fisheries. Most modern gear is generally made of synthetic materials and metal, and can persist for a very long time in the environment. Once lost from the control of a fisher, derelict gear can degrade sensitive habitats, create hazards to safety and navigation, continue to capture wildlife, and compete with active gear. This can lead to injury or death for animals that become trapped or entangled in the derelict gear.

Plastics and other single-use items are a big part of our waste stream and a very visible part of the marine debris problem. In many communities, restaurants and food service businesses seek alternatives to single-use materials, but may need assistance in making the transition.

In order to reduce the economic impacts of marine debris, the NOAA Marine Debris Program (MDP) funds projects that benefit commercial and recreational fisheries, small businesses, and coastal communities by preventing marine debris from entering the marine environment in the first place and removing existing debris from shorelines and coastal areas.



Photo: NOAA

BACKGROUND INFORMATION:



Plastic Marine Debris

Plastic debris is the most abundant type of marine debris in our ocean, waterways, and Great Lakes. The word “plastic” is used to describe a collection of synthetic or manmade organic compounds (polymers), often derived from petroleum. Plastic polymers can be altered to come in many shapes, sizes, colors, and densities.

Plastic marine debris found in our ocean or waterways is often consumer items such as food wrappers, plastic beverage bottles, plastic bottle caps, plastic/foam carryout containers, drinking straws, and grocery bags. Plastic marine debris also includes items such as lost/discarded fishing gear or plastic sheeting. All of these plastic items can enter the marine environment in a variety of ways, including ineffective or improper waste management, intentional or accidental dumping or littering, or through stormwater runoff. Once in the environment, plastics will remain there indefinitely, which is why preventing these items from entering our waters in the first place is especially important.

Common Types of Plastic

Resin Code	Name	Product Examples
	Polyethylene Terephthalate (PETE, PET)	Plastic bottles, food jars, ovenable and microwavable food trays, textiles (polyester), monofilament, carpet, and films.
	High-Density Polyethylene (HDPE)	Bottles (beverage, detergent, shampoo), bags, cereal box liners, extruded pipe, and wire and cable covering.
	Polyvinyl Chloride (PVC)	Packaging (clamshells, shrink wrap), pipes, siding, window frames, fencing, flooring, and medical products (blood bags, tubing).
	Low Density Polyethylene (LDPE)	Bags (produce, dry cleaning, newspaper, and garbage bags), squeeze bottles, container lids, shrink wrap, toys, coatings for milk cartons and beverage cups, and wire and cable coverings.
	Polypropylene (PP)	Yogurt and other food containers, medicine bottles, straws, bottle caps, fibers, appliances, and carpeting.
	Extruded and Expanded Polystyrene (PS)	CD cases, yogurt containers, cups, plates, bowls, cutlery, hinged takeout containers (clamshells), electronic housings, building insulation, coat hangers, medical products, packing peanuts and other packaging foam, foamed coolers, and egg cartons.
	Other is a resin different than the six listed above, or made from a combination of resins.	Three- and five-gallon reusable water bottles, glasses (lenses), some citrus juice and ketchup bottles, oven-baking bags, and custom packaging.