



## Plastic Gyre Dangles

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*Created by Center for Alaskan Coastal Studies  
in partnership with the Washed Ashore Project*

### Essential Questions

How are people connected to coasts and oceans?  
How do people affect coasts and the ocean?  
How can people protect coasts and the ocean?

### Enduring Understandings

- Art is a powerful way to communicate knowledge about and create an emotional connection to marine ecosystems and stewardship.
- Everyone is responsible for caring for the ocean.
- Connections between humans and the ocean are important.
- Plastics and other pollution knowingly or unknowingly introduced into the ocean by people can have negative effects on marine ecosystems.
- You can reduce the solid and liquid pollution you are introducing into the ocean.
- Making informed decisions as a consumer helps to protect the ocean.
- Watersheds, rivers, wetlands and the one big ocean of the world are an interconnected system.

### Objectives

Students will connect their personal consumer choices with the effects of marine debris on the marine environment. They will understand that plastics accumulate in ocean gyres. They will create a collaborative sculpture from marine debris representing plastic pieces in an ocean gyre to help people understand and connect with issues of marine debris.

### Concept

Marine debris in the ocean is transported by wind and currents. Debris large and small tends to accumulate in ocean gyres, such as the North Pacific and North Atlantic. A thin soup of small plastic can extend for miles and miles in a gyre, having serious effects on marine ecosystems. This activity transforms marine debris plastic pieces into an interactive sculpture that people can walk through to experience the perspective of a fish, bird or marine mammal swimming through plastic in a gyre.

*Image courtesy of Center for Alaskan Coastal Studies*



### Materials:

- Pieces of plastic marine debris (1-4 inches, red, orange, yellow, green, blue, violet and white)
- Pieces of blue rope from marine debris
- Pencils
- Science Notebooks
- Fishing Line or 20 gauge wire
- Drill with ¼ inch (.63 cm ) or similar size drill bit
- Safety goggles
- Work gloves
- Technology for viewing videos

## Background

Marine debris is an issue throughout ocean ecosystems. A large amount of plastic marine debris is transported by winds and currents through ocean gyres, such as the North Pacific and North Atlantic, where it accumulates and photodegrades into smaller and smaller pieces. These plastic pieces pose many threats to marine ecosystems. The small pieces especially tend to be ingested by forage fish that mistake the plastic particles for plankton. These forage fish are in turn consumed by predators, some of which are then caught and eaten by people. Furthermore, plastics in the marine environment can block sunlight from penetrating into the water column, preventing phytoplankton from absorbing the sunlight needed to photosynthesize and obscuring the light small fish and zooplankton use to find food. In this art activity, students create a representation of a plastic-filled gyre and then walk through it to get a sense of what it might be like to swim through a gyre.

## Preparation

Set up a safe drilling station with a drill, safety goggles and work gloves or have an adult predrill one or two holes in each plastic piece. Create a sample gyre dangle by stringing pieces of plastic onto fishing line or wire. Prepare technology for viewing video in classroom, by loading and testing video on a Smartboard, computer with projector, or individual computers for students to view.

Ideally, you will be able to take your class to a nearby beach, lakefront, riverbank or wetland to collect debris and see the problem firsthand. If you cannot conduct a field trip to collect marine debris at the time of this lesson, you can use marine debris collected at an earlier time or you can contact the Center for Alaskan Coastal Studies if you need help acquiring marine debris pieces. It is critical that students remain safe during this activity, so be sure to explain that they should leave potentially dangerous marine debris (such as needles or broken glass) behind. It is recommended that at least one person in each group have rubber gloves, preferably reusable, to handle rusty and otherwise “iffy” marine debris.

## Introduction

Watch clips from the Gyre Expedition or 5 Gyres Institute as a class. They can be found at <http://newswatch.nationalgeographic.com/2013/08/14/gyre-expedition-probes-impact-of-plastic-pollution-on-remote-beaches/>, <http://vimeo.com/71161144>, and <http://vimeo.com/24020595>.

Look at a few pieces of photodegraded debris that the group will be using for creating of the dangles and explain to the students where they were found. Ask the students to try to determine what they once might have been. What is their story? Does the item look new or old? Are there any clues of what it might have been used for? Are there any clues to the place or date of origin (packaging labels, etc.)?

Explain to students that they are going to use marine debris to create a sculpture meant to depict small bits of plastic concentrated in an ocean gyre.

## Procedures & Activities

Collect different colors of plastic marine debris that are no larger than the palm of a hand, or use marine debris that have already been collected during a marine debris cleanup. Use a drill to create one or two holes in each piece of plastic.

Ask students to separate the pieces of plastics by color in glass jars or flat trays. Then, they can begin stringing the dangle. Use thick fishing line or 20-gauge wire to tie a red piece of marine debris at the bottom of the dangle. The plastic pieces should be arranged by color, with about 6 inches of red at the bottom, followed by orange - yellow - green - blue - purple and ending with white. Create a loop in the fishing line or wire so the dangle can be attached to the map. Completed dangles will measure about 3-6 feet long.

As students finish dangles, have them use the loop of fishing line or wire to attach the dangles to the “Top of the Ocean” mat (see “Top of the Ocean” lesson plan). It works well for students to work on these two projects

concurrently. If you do not wish to create a “Top of the Ocean” mat, have students attach the gyres to the ceiling, pieces of rope, or netting.

Research the impact of marine debris “garbage patches” in gyres on marine organisms, and particularly the effects of ingesting plastics. Ask the students to write an artist’s statement to accompany the gyre dangles they have created and record it in their science notebook. The artist’s statement should explain where the materials for this project came from and the effects these materials could have on organisms living in the gyres.

After they write their artist’s statement, have each student share it with a partner and then underline an important sentence in their statement. Ask students to share their most important sentences with the class. Record them on the board, discuss what is missing, and work together to create a complete artists’ statement for the whole class that will be displayed with the completed sculpture.

## Wrap-Up & Extensions

Once the dangles are attached to the “Top of the Ocean” mat, have each student move through the sculpture. Try to arrange the sculpture in an area where a good amount of light is blocked by the dangles. As students make their way through the sculpture, have them imagine what it might be like to be a fish or a bird searching for food in this environment, or phytoplankton in need of light to photosynthesize. Have students reflect in their science notebooks on the experience and what they felt as they navigated through the garbage patch.

## Evaluation

Review the artist statements and personal reflections that students recorded in their science notebooks to evaluate student understanding of the origin and ecosystem effects of plastic in ocean gyres. Observe their effort and craftsmanship during the creation of the dangles. If you would like to evaluate based on artistic criteria, post the following before commencing the lesson:

### ARTISTIC CRITERIA TO POST:

- Collect from the ocean beaches 1 to 4 inch sized plastic debris pieces that are three-dimensional and some that are recognizable objects.
- Separate them by the rainbow colors of red, orange, yellow, green, blue, purple, and white.
- Create strings of nicely balanced rainbow plastics that vary in length from 3 to 6 feet.
- Look for a variety of textures, shapes and objects to create an interesting string of colors.
- Use good craftsmanship by twisting the wires securely and neatly with no sharp points.
- Attach the gyre dangle to the woven matted “Top of the Ocean” to create an evenly spaced yet random look that invites the viewer into the walkway.

### Sponsors

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