
TALKING TRASH & TAKING ACTION
OCEAN CONSERVANCY & NOAA MARINE DEBRIS

We face many complex challenges when it comes to a clean and healthy ocean, but one problem is simple to understand:

TRASH.

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Introduction

We depend on our ocean for the food we eat, the water we drink and the air we breathe. But beyond these vital resources, there exists a multitude of other reasons why we love the water, from the creatures who call it home to the shores we visit and explore.

Marine debris is one of the greatest threats our ocean faces, but luckily it is an issue with which we can all play a part in the solution. Talking Trash & Taking Action is a marine debris education partnership between Ocean Conservancy and the NOAA Marine Debris Program. It was developed as a means to educate the next generation about ocean trash and, most importantly, how we all can prevent it.

Thank you for taking part in Talking Trash & Taking Action. This instructor's guide was designed in a flexible manner to fit your needs. Whether you have one hour, one day or one week, the information and activities in this guide will allow you to develop a personalized marine debris education program. The guide is designed to be a resource for activities and information that can fit into existing lesson plans or can be followed verbatim as its own set of lesson plans.

2 pre-SURVEY

Objective: The Pre-Survey is to gauge participants' initial knowledge of marine debris. At the conclusion of this program, participants will be asked to complete the same survey. The answers will be used solely to understand if marine debris knowledge increased after participating in the Talking Trash & Taking Action program.

INSTRUCTIONS

1. The survey can be conducted individually or as a group.
2. Explain that this survey is not being graded; it is simply for Ocean Conservancy and all of us (participants) to see how much we learn throughout this program.
3. If conducting individually: ask participants to fill out the survey and hand it back to you. It can be completed anonymously so participants do not think they are getting graded on the activity. Collect the surveys to send back to Ocean Conservancy.
4. If completing as a group: ask participants to put their heads down or cover their eyes. They should raise their hand when they think they hear the correct answer. Write down the number of responses for each answer to compare to the results of the Pre-Survey.
5. Tell participants that at the end of the program, everyone will take the survey again to see how much the group as a whole learned!

SURVEY

1. Which of these activities can lead to trash in the ocean?

A. Throwing a gum wrapper out of a car window
B. Accidentally leaving sand toys on the beach
C. Wind blowing trash out of a full trash bin
D. All of the above

2. Who is in charge of keeping trash out of the ocean?

A. The President
B. Beach visitors
C. Trash collectors
D. Everyone

3. True or False?

The foam cups used to keep hot drinks hot and cold drinks cold are made out of plastic.

4. Marine debris is...

A. An animal that lives in the deepest part of the ocean
B. Any kind of trash that ends up in the ocean
C. A small plant that floats on the surface of the ocean
D. The seaweed that washes onto the beach

5. What is the main cause of marine debris in the ocean?

A. Land-based waste such as littering
B. Ships dumping trash into the ocean
C. Plants and animals in the ocean
D. Tsunamis, hurricanes and tornados (storms) blowing debris into the ocean

6. True or False?

The ocean is always downstream.

7. Trash from which state can end up in the ocean?

A. Florida
B. Michigan
C. Colorado
D. Every state

8. Which of these is NOT a result of marine debris?

A. A harmful bloom of algae (red tide)
B. A seagull getting tangled in fishing line
C. A person stepping on broken glass on the beach
D. A turtle eating a plastic bag

9. The “Great Pacific Garbage Patch” is most like...

A. A floating island of trash you can see from space
B. A plastic soup
C. A place for ships to take their trash
D. All of the above

10. True or False?

Marine debris is too small to damage boats.

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exploring OCEAN TRASH

OBJECTIVES:

1. To Define Marine Debris

- Where does it come from?
- What is it made of?
- How does it relate to me?

2. To Explore the Inland to Ocean Concept

- Trash Travels
- Watersheds
- Ocean Currents and Gyres

3. To Understand Impacts of Marine Debris

- On Ecosystems
- On Me and My Community

INTRODUCTION: TRASH TALE

OBJECTIVE: The purpose of this activity is to provide a fun and entertaining introduction to marine debris—what it is and where it comes from.

INSTRUCTIONS:

1. This can be completed as a group or in pairs. If working in pairs, have the participants split up the word blanks. There is a shorter tale provided in the online activity bank if time is limited.
2. Have participants provide words to fill in the blanks of the story and then read the group's story aloud or have paired participants read their story to another pair.

TRASH TALE 1: THE JOURNEY OF JUNK

It was a hot summer day. The park was crowded with children, parents and [pet (plural)]. Anna couldn't wait for her favorite afternoon treat. She perked up as the jingling sound of [song title] reached her ears. She ran up to the familiar colorful truck and ordered her favorite, a(n) [food item] with chocolate and sprinkles. It tasted [adjective], just as she expected! Then, she saw the other kids playing [sport] and she wanted to join. She saw an overflowing trash can nearby and quickly tossed her plastic wrapper on top and ran off to play.

That night, it was so windy and rained cats and [animal (plural)]. The plastic wrapper flew from his perch on top of the trash can and was swept away. He traveled down a shallow [color] river until he was suddenly sucked down a narrow hole. SWOOSH!! "[exclamation]!" he said, "It's so dark down here. I can't see a thing. And it smells [adjective]!". After many [length of time], the plastic wrapper reached the end of the tunnel and tumbled down into a river. He floated on top of the water and meandered his way past [plant (plural)] and [animal (plural)]. Suddenly the water become cold and salty, and the wrapper realized he had reached the ocean!

The sun was hot like [something hot]. The plastic wrapper sank beneath the surface and came face to face with a giant [marine animal]! "[exclamation]"! He floated with the ocean current, minding his own business, when suddenly he felt a tickle! A(n) [marine animal] was trying to eat him! It must think he is a(n) [different marine animal]! The little wrapper tried to [action verb] away but with no luck. Everything went dark.

Oh, if only Anna had taken the little wrapper home. The little plastic wrapper could have been warm and [adjective] back on land. He could have been re-used and made into a(n) [item made of plastic]. Don't let your trash get eaten. Always [good thing for the environment] or [another good thing for the environment]!

PRE-CLEAN UP OBJECTIVE 1: Defining Marine Debris, Sources, and Types

What exactly is marine debris?

ASK: Has anyone ever heard of marine debris?

Provide participants with this formal definition:

Marine Debris is considered 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).

ASK: Based on that definition, what items do you think are considered marine debris?

ASK: Do you think we can make our own definition that everyone would understand?

As a group, break down and discuss words in the official definition and develop a definition that everyone can understand.

ACTIVITY: WHAT DOESN'T BELONG?

OBJECTIVE: Participants will learn what marine debris is and see how it doesn't belong in the natural marine environment.

MATERIALS: What Doesn't Belong? graphic

INSTRUCTIONS: Using the provided graphic, have participants find what doesn't belong in the picture.

ACTIVITY: TOP 15 MARINE DEBRIS ITEMS

OBJECTIVE: Participants will discover which trash items are the most common marine debris items collected on beaches and waterways, and they will explore the items' composition and potential origin.

MATERIALS:

- Grey Debris Deck
- Top Marine Debris Items List (included at the end of the activity)

** This activity can be done without cigarette butts. Follow the same instructions below but exclude the "cigarette butt" card.*

INSTRUCTIONS:

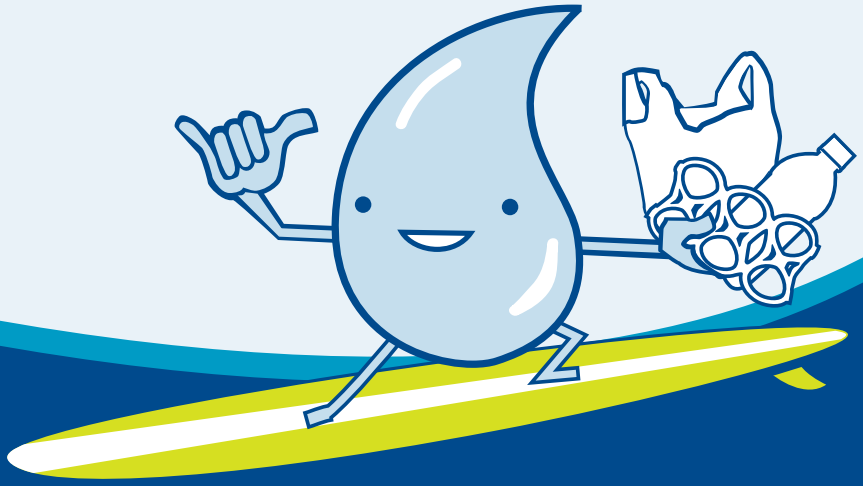
1. **SAY: Now that we understand what marine debris is, let's determine what the most common types of marine debris are.**
2. Give one marine debris item card (or the actual item, cleaned) to15 volunteers if you have a large group or give one to every participant if your group has 23 or less participants.
3. Instruct participants to work together to determine what they think the most common collected marine debris items are. Instruct them to line up in order, from the most common item to the 15th-23rd (depending on number of participants) most common item. Make sure participants are holding their items or cards for the entire group to see.
4. Have each participant in line state his or her item and, if time allows, why he or she is in that spot (i.e., "I have plastic grocery bags and we think this is the number one item because we use them every day and see a lot of them on the street and in parks."). Start at what they believe the most collected item is and proceed down the line.
5. Using the Top Items list, arrange the participants in the actual order of the top marine debris items to see how close their guesses were.

   ** If you excluded cigarettes butts: Reveal to the group that, in fact, cigarette butts/cigarette filters are the number one marine debris item collected. The order of the list is still the same, only cigarettes/ cigarette filters are at the top, and this bumps the other items down a spot.*

DISCUSSION: Ask participants these questions about the Top 15 list:

- Are you surprised by any of the items on the list?
- Where do you think these items came from?
- What are these items made of?
- How many are plastic?
- Do you use any of these items on a daily basis?

When this activity is over, have the participants hold onto their cards for the next activity.



TOP 15 MARINE DEBRIS ITEMS

RANK	MARINE DEBRIS ITEM	TOTAL COLLECTED	FUN FACT
1	Cigarette Butts	2,043,470	That's enough cigarettes that when laid end to end, they are the same length as 4,257 school buses. Did you know these butts (the filters) are actually made from type of plastic called cellulose acetate?
2	Food Wrappers	1,685,422	Did you know that most food wrappers, including chip bags and candy wrappers are actually plastic? (See Marine Debris Composition to learn more.)
3	Plastic Beverage Bottles	940,170	That's enough beverage bottles to give every fan attending the Super Bowl 11 sodas.
4	Plastic Bottle Caps	847,972	That is enough bottle caps that when laid end to end, they would cover 3 football fields.
5	Straws/Stirrers	555,007	In the United States alone, 500 million straws are used and thrown away every single day. **(www.ecocycle.org/bestrawfree).**
6	Plastic Grocery Bags	441,493	That's enough grocery bags that when combined, they weigh more than a pickup truck.
7	Glass Beverage Bottles	394,796	All glass bottles can be beautiful and are great for reusing as vases or for other craft projects.
8	Other Plastic Bags	389,088	These include garbage bags, sandwich bags, clothing store bags, newspaper bags and more.
9	Paper Bags	368,746	It is estimated Americans consume more than 10 billion paper bags each year **(www.inteplast.us/ibs/InteGreen/facts.html)**. That's a lot of bags!
10	Beverage Cans	339,170	Did you know once recycled, an aluminum can becomes a new can in as little as 60 days **(www.kab.org/site/PageServer?pagename=recycling_facts_and_stats)**?
11	Plastic Lids	312,996	This category includes lids for to-go drinks such as soda and coffee.
12	Metal Bottle Caps	304,638	Metal bottle caps are great for crafts. Collect metals caps to use as decorations for picture frames or games like checkers.
13	Plastic Cups and Plates	282,743	That is enough cups and plates to host a block party for every single person in Newark, New Jersey.
14	Plastic Takeout Containers	234,692	Next time, think about reusing these to-go food containers for storing things such as baseball cards or craft supplies.
15	Other Plastic/Foam Packaging	233,595	This category includes plastic tarps, crates, fishing bait containers and the foam packaging that surrounds new appliances and electronics. While it may seem crazy, even foam is a type of plastic!

Source: 2013 International Coastal Cleanup.
Please visit www.oceanconservancy.org/our-work/international-coastal-cleanup/ for the most up to date Top 10 List or www.coastalcleanupdata.org to find out your local top debris items found.

MARINE DEBRIS SOURCES

OBJECTIVE: Participants will discover the main sources of marine debris.

Define the term *source* with participants.

ASK: Where do you think marine debris comes from? *or* What is the source of marine debris?

Marine debris sources are broken into two main categories: ocean-based and land-based. The majority of marine debris originates on land.

1. Ocean-Based Sources:

- Fishing Vessels: Fishing gear such as fishing lines and traps can be lost from fishing boats (referred to as derelict fishing gear).
- Recreational Boaters: Trash and fishing gear can fall overboard if not stored properly.
- Stationary Platforms (Oil and gas drilling platforms): Hard hats, gloves, pipe protectors and 55 gallon drums can all be lost from platforms.
- Cargo and Other Vessels: Ships caught in rough seas can lose a variety of items that are being transported, including entire shipping containers. Shipping containers carry many products long distances from where they were made to where they will be sold. Products from sneakers to bath toys have been lost from cargo ships.

2. Land-Based Sources:

- Litter: Any trash that is not properly disposed of can end up in waterways and eventually in the ocean.
    - Trash cans or recycling containers may not be readily available, which can lead to inappropriate disposal. Some people simply do not put trash where it belongs. Examples of littering include: leaving food wrappers at the park, throwing fishing line from a boat, or releasing balloons into the sky.
    - Littering can also be accidental. Examples include: a plastic grocery bag flying out of a car window or losing a ball at the beach.
- Dumping: Disposal facilities for large or hazardous items may be difficult to find, or they may charge fees. Rather than pay these fees, people may dump large materials such as construction materials, appliances, furniture, mattresses and hazardous waste near creeks or rivers.
- Storm Water Discharges: Storm drains carry litter and runoff to waterways that lead to the ocean. Any trash left along the street can easily wash into storm drains and eventually make it to the ocean.
- Poor Waste Infrastructure: In some parts of the world, there are no landfills or recycling centers for peoples' trash. In fact, in many places, trash cans do not exist and trash is simply piled on the street or in dry riverbeds. Without a confined place for trash, it is very easy for waste to end up in the ocean.
- Natural Disasters: Events such as tornados, hurricanes, floods and tsunamis can scatter debris into the marine environment.

ACTIVITY: MATCHING TRASH

OBJECTIVE: Participants will learn the different sources of marine debris as well as the different materials that marine debris is comprised of by grouping different types of marine debris together.

MATERIALS:

- Grey and/or White Debris Decks (some participants already have these in hand from previous activity)

INSTRUCTIONS:

1. Participants should now understand the most common types of marine debris and where they originate.
2. “ **SAY: Now let’s look deeper into how items become marine debris and the different sources of ocean trash.**
3. Make sure all participants have a card from the Debris Deck (some will already have cards from the previous activity). If there are more than 23 participants, pass out the additional item cards from the white Debris Deck.
4. Participants will have 2 minutes to group themselves based on what type of marine debris card they have. Participants can group themselves in any way they think makes sense. Examples include: fishing gear, food, made from plastic, land-sources, ocean-sources, etc. The possibilities are endless!
5. After the allotted time, have each group explain why they grouped together.
   “ **PROMPT**, if necessary: **Was it based on the source of the item? What the item was made of? What the item was used for?**
6. (Optional) Participants will have an additional 2 minutes to group themselves based on different criteria. This gives participants a chance to be creative and shows how many different possibilities there are to match trash.

EXAMPLE GROUPINGS

MARINE DEBRIS COMPOSITION

Up to this point, participants have discovered a lot about marine debris including what it is and where it comes from. Next, participants will learn about composition and what happens to trash once it enters waterways.

“ ASK: Does anyone know what *compose* or *composition* means?
Allow participants to make guesses, and foster the discussion by providing hints. Then explain the definition of composition to participants.

“ ASK: What types of materials are marine debris items composed of?
To encourage responses, **“ ASK: Do you remember the top marine debris items? What materials are they made of (or composed of)?**

Marine debris can be composed of a wide variety of different materials, but usually, marine debris is made of one or a combination of the following:

- Plastic
- Glass
- Metal
- Paper
- Cloth
- Rubber
- Wood

“ ASK: Which material do you think people find the most of when cleaning up marine debris?

- During the annual International Coastal Cleanup, over 80% of the marine debris items collected by citizen scientists are plastics.
- If time allows, **“ ASK: Why do you think volunteers find so much plastic?**
- Plastic is light, and much of it floats, so it’s more apt to be collected during cleanups. Also, many of the items we use every day are made of plastic, so there is high plastic consumption and plastic waste.

“ SAY: We’ve learned that a lot of marine debris is composed of plastics, like plastic bottles and fishing line. But did you know that many other items are composed of plastic, too?

“ ASK: What about chip bags? Does anyone think those are made of plastic?
Chip bags, even the shiny metallic inside, are composed of thin layers of a type of plastic.

“ SAY: Even foam is a form of plastic. Take-out food containers, packing peanuts, foam cups and packaging that protects electronics (or items) like televisions are all a type of plastic.

MARINE DEBRIS DECOMPOSITION

“ SAY: Since we understand what *composition* means, can we figure out the definition of *decomposition*?

Once participants have the chance to guess the meaning, explain decomposition and biodegradation.

The formal definition of *decomposition*: the process of breaking down into pieces or simpler elements by natural processes, chemicals, or some other force (Oxford & Merriam-Webster).

The formal definition of *biodegradation*: a process by which microbial organisms transform or alter (through metabolic or enzymatic action) the structure of chemicals introduced into the environment (EPA).

ACTIVITY: THE TIME IS RIGHT!

OBJECTIVE: Participants will learn the estimated length of time it takes for certain marine debris materials to decompose in the ocean.

MATERIALS:

- Decomposition Chart (included below)
- (Optional) Portable white boards (included) and wet erase marker or paper and pencils for participants to write guesses

INSTRUCTIONS:

1. Select 2 or 3 participants to *"Come on down!"* and stand in front of the group.
2. Explain to participants that they will be asked to guess how long it takes for certain items to decompose in the marine environment (i.e., a week, 5 months, 400 years).
3. Select a marine debris item from the chart below and proclaim it to the group.
4. Allow about 15 seconds for the contestants to write their guesses about the amount of time it takes for the item to decompose on the white board or piece of paper. Then have them reveal their answers to the crowd.
5. Announce the actual amount of time it takes for the item to decompose. The contestant with the closest guess without going over is the winner of that round.
6. If there is a tie (for example, the correct answer is a range of time and two participants answer within the range), then both win the round.
7. Proceed through the entire list of items, making sure each participant gets a chance to be a "contestant."

DISCUSS: Gauge participants' reactions.

ASK: Are you surprised by the amount of time it takes for some materials to fully decompose? Which items?

ASK: Many of the items we use for a few seconds or minutes may take hundreds of years to break down in the ocean. What do you think this means for trash in our ocean?

TYPE OF DEBRIS	DECOMPOSITION RATE
Paper Towel	2–4 weeks
Newspaper	6 weeks
Apple Core	2 months
Cardboard Box	2 months
Cotton Shirt	2–5 months
Waxed Carton	3 months
Plywood	1–3 years
Wool Sock	1–5 years
Plastic Grocery Bag	10–20 years*
Foam Cup	50 years*
Tin Can	50 years
Aluminum Cans	200 years
Disposable Diaper	450 years*
Plastic Beverage Bottle	450 years*
Fishing Line	600 years*

**Items are made from a type of plastic. Although no one has lived for 450 or 600 years, many scientists believe plastics never entirely go away. These decomposition rates are estimates for the time it takes for these items to become microscopic and no longer be visible. Sources: EPA, Woods Hold Sea Grant*

DECOMPOSITION RATES

These decomposition rates are an insightful way for us to look at the long-term impacts of marine debris in the future. Let's revisit plastics.

SAY: In the previous activity, we saw that it takes a plastic bottle about 450 years to decompose. But does plastic ever completely return to a natural state?

The answer is no. Plastics are different from the other materials that make up marine debris. Plastics do not biodegrade the way other materials do. Instead, they photodegrade. Explain that this means that instead of being broken down naturally by other organisms, plastics are broken down into smaller and smaller pieces by the sun, wind and waves, but they never completely go away.

ACTIVITY: PLASTIC BREAKDOWN

OBJECTIVE: Participants will understand the difference between the breakdown of plastics and the decomposition of other materials and will see firsthand how photodegradation works.

MATERIALS:

- One piece of paper for each participant. It does not have to be particularly big. The size of your hand will do.

INSTRUCTIONS:

1. Instruct participants to take their pieces of paper and see how many times they can break or rip that piece of paper into smaller and smaller pieces.
2. By the end, participants will likely have a pile of very small pieces that they can no longer rip.

DISCUSSION:

- Explain that this activity mimics how plastics break down in the ocean. They are still there (as your piece of paper is), but they have simply been broken into many smaller pieces.
- Explain that these tiny pieces of plastic are called microplastics. Tiny plastic pieces are especially harmful as they are easily ingested by animals and are very difficult to remove from the marine environment.

PRE-CLEANUP OBJECTIVE 2: Inland to Ocean Concept, Ocean Currents and Gyres

In the previous objective, participants learned about marine debris: what it is, where it comes from and what it is made of. This next section will discuss how marine debris travels from land to sea. And once in the sea, how does it travel across oceans?

TRASH TRAVELS THROUGH WATERSHEDS

To show how trash travels from inland waterways to the ocean, participants first need to understand the concept of a watershed.

ASK: How do you think trash travels to the ocean?

- Trash is carried from its original resting spot via wind or rain to storm drains.
- Storm drains carry trash directly to waterways like streams and rivers.
- Following the path of their watershed, those rivers transport the trash to the ocean, resulting in marine debris (EPA).

Gauge participants' understanding of the term *watershed*.

ASK: As a group, can we come up with a definition for the word *watershed*?

"A watershed is the area of land where all of the water that falls in it and drains off of it goes into the same place" (USGS). Watersheds come in all shapes and sizes. They cross county, state, and national boundaries. In the continental U.S., there are 2,110 watersheds; including Hawaii, Alaska and Puerto Rico, there are 2,267 watersheds (EPA).

ACTIVITY: TRACE THE TRASH

OBJECTIVE: Participants will demonstrate how trash travels through an inland watershed and reaches the ocean.

MATERIALS:

- Laminated map of the rivers of the United States (provided) and wet erase markers

INSTRUCTIONS:

1. Ask volunteers to come up to the map and point out where they were born, their favorite place to visit or a location they really want to visit (or any other spot on the map).
2. Using the wet erase marker, have the participant imagine that a piece of trash was dropped on the map and have them trace the path the piece of trash would take by following the paths of the watershed.
3. The participant should eventually trace a path that leads to the ocean.
4. Have multiple participants volunteer to trace their trash.
5. End with a brief discussion about how easy it is for inland trash to wind up in the ocean, even if that is not where it was intended to go.

If you have access to a computer and wish to dive deeper on this topic, check out the USGS website to pin point your groups' watershed **(https://water.usgs.gov/wsc/map_index.html)**, and use the interactive map to trace your unique inland to ocean journey **(http://nationalmap.gov/streamer/webApp/streamer.html)**.

TRASH TRAVELS ACROSS THE OCEAN

"SAY: **Okay, so now we understand how trash can reach the ocean even from places very far from the beach.**

"ASK: **Does anyone have a guess for what happens once trash enters the ocean?**

- Participants may start to discuss the impact to animals, such as "turtles eat it" with this question. While many of their answers will be correct, you are trying to elicit discussion about trash traveling around the world aided by currents and winds.
- Once in the ocean, currents and atmospheric winds carry trash. These systems can transport debris thousands of miles from its original starting point. Factors that affect currents such as seasons and large storms can also affect trash movements (NOAA).

ACTIVITY: CURRENT, CURRENT: WHERE DO YOU GO?

OBJECTIVE: Participants will learn about currents and have the chance to draw where they think a current belongs on the map.

MATERIALS:

- Laminated world map (included) and laminated labeled current map (included)
- Wet erase markers

INSTRUCTIONS:

1. "SAY: **Does anyone remember "Crush" from Finding Nemo? He spent a lot of his time in a current.**
2. "ASK: **Are there any volunteers who would like to draw a current on the map?**
3. Encourage them not to be shy. Explain that this is a hard activity, but together the group can draw very accurate currents. Volunteers can simply draw a directional arrow pointing in the direction they think the current is flowing.
4. Once volunteers have drawn their current guesses, create the path of an actual surface current by erasing some of the incorrect guesses and joining other guesses. Use the provided map with current names and directions for assistance.
5. Use the map the group created as a visual aid to start to discuss gyres.

OCEAN SURFACE CURRENTS: THE MARINE DEBRIS HIGHWAYS

Surface ocean currents are mainly driven by global wind patterns. You can think of wind as a solid object that scrapes along the top of the ocean and pulls water in the direction that it's blowing. Ocean currents are made more complex because of land masses, the uneven heating of Earth, and the fact that Earth spins about its axis. (NOAA)

“ SAY: Currents are important because they carry nutrients and organisms (like Crush!) throughout the ocean, sustaining countless marine habitats and wildlife.

Currents are also important because they regulate Earth's climate. The Gulf Stream Current brings warm water from the equator along the east coast of the United States and eventually toward England. This current keeps Northern Europe much warmer than many places as far north.

Currents, both at the surface and deep within the ocean also carry trash.

Circular currents cause the accumulation of marine debris in specific areas.

- Gyres, or large rotating ocean currents, can trap trash and marine debris at their centers. This can also happen on a smaller scale as a result of eddies and other factors (NOAA).
- Gyre currents rotate clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere. Worldwide, there are five major subtropical oceanic gyres: the North and South Pacific Subtropical Gyres, the North and South Atlantic Subtropical Gyres, and the Indian Ocean Subtropical Gyre. (NOAA)
- One of the most well-known gyres is the North Pacific Gyre. This area is also referred to as the “Great Pacific Garbage Patch” and has received a great deal of media attention.

“ ASK: Has anyone ever heard of the “Great Pacific Garbage Patch”?

“ ASK: What do you think this “garbage patch” looks like?

Participants may start to describe a large floating island of trash.

The name “Great Pacific Garbage Patch” has led many to believe that this area is a large and continuous patch of easily visible marine debris, like an island that is visible from space. This is not accurate.

Higher concentrations of trash items can be found in this area, along with other debris such as derelict fishing nets, but most of the debris are actually very small pieces of plastic (NOAA).

The garbage patch is not so much an island as it is a plastic soup. Imagine the garbage as the vegetables and the ocean as the broth.

Just like in soup, the pieces of trash in the gyre collect at different levels in the water column, not just at the surface.

The debris is continuously mixed by wind and wave action and widely dispersed both over huge surface areas and throughout the top portion of the water column (NOAA).

The North Pacific Gyre is well known for the debris that has gathered at its center; however it is not the only plastic soup—marine debris accumulates in every ocean gyre.

ACTIVITY: MAKE YOUR OWN GYRE

OBJECTIVE: To understand that oceanic currents create gyres and to show how trash travels through those currents, accumulates within the gyre, and may be sent back to shore.

MATERIALS:

- A medium size circular container or bowl (pie tin, plastic food storage container, etc)
- A lightweight breakfast cereal (Lucky Charms works well) or another collection of small items that float.
- A spoon
- Water

INSTRUCTIONS:

1. Fill the container ¾ of the way full of water.
2. Explain to participants that this bowl represents the Pacific Ocean and the sides of the bowl represent land masses, such as Asia and North America.
3. Add a small handful (no more than ¼ cup) of the cereal to the water. The cereal represents marine debris.
4. Using a spoon, stir the water in a circular motion for about 10 seconds, keeping the spoon near the edges of the bowl.
5. Remove the spoon from the water and watch what happens—the cereal will follow the "currents" and then some will begin to accumulate and group together at the center of the currents while others will be shot out of the current and will stick to the sides of the bowl.
6. Explain to the participants that this represents what happens to trash when it travels through ocean currents and into a gyre. The trash can accumulate at the center of the gyre (like the "Great Pacific Garbage Patch"), or it can be sent back to shore, where it collects on beaches far away from where it originated.
7. (Optional): If you have enough materials available, split the participants into groups and allow each group to do the experiment on their own. The groups will see the same results.

GO CLEAN UP THE GYRE?

"**ASK:** **Do you think we can clean up the ocean gyres by removing all the trash?**

"**SAY:** **Unfortunately, the situation is much more complicated:**

- Never stationary: The ocean and gyres are always moving and changing throughout the year.
- Difficult to see: Much of the debris is small pieces of plastic that cannot be easily spotted or collected. Other debris, like derelict fishing nets and traps, are difficult to remove without special equipment.
- Other marine life: These areas are also abundant with marine animals, some very small—even microscopic—that make removing only the trash difficult.
- Cost: The gyres are so immense that the cost of cleaning just 1% would cost anywhere from $122 to $489 million a year! (NOAA)

IMPACTS ON ECOSYSTEMS

In the previous two objectives, participants explored what marine debris is, what it is made of, where it comes from, and how it travels.

ASK: Now that we have talked all about marine debris, why should we care about the issue? Why is marine debris a bad thing for our ocean?

- Participants should talk about the negative impacts of marine debris.
- Marine debris negatively impacts the marine environment, animals and even you.

EXPLAIN: Many of the things you are saying are called ecosystem impacts.

SAY: Let's create definitions for the words *ecosystem* and *impact*. (Note: This is only necessary if needed by participants.)

To help participants: The origin of the word "Eco" is Greek, meaning house. So think about it like this: "house system." Your home and school are part of your: _____. (ecosystem)

- Remember the word *impact* can also mean something positive. This will be discussed in more detail, but keep it in mind when defining *impact*.
- The formal definition of *impact* is: the effect or influence of one person, thing, or action on another (Oxford Dictionary).

ENTANGLEMENT

- Entanglement is one of the major issues caused by marine debris. Entanglement is when something becomes twisted or trapped by something else. Marine debris can easily entrap animals and cause serious problems.
- Nets, ropes, lines, fishing gear, ribbons, 6-pack rings and many other types of marine debris can entrap marine species, limiting their ability to move, eat and breathe.
- Ghostfishing: The phenomenon of animals (fish, marine mammals, turtles, etc.) getting caught in fishing nets, lines or traps that have been lost or released and are no longer being operated by people.
- Entanglement can result in injury, illness, suffocation, starvation and even death.
- Animals spend valuable time and energy trying to escape from entangled trash on their bodies, but they are often unable to do so.
- In 2010, 488 animals were found entangled by marine debris during the International Coastal Cleanup.
- Although animals such as seabirds, sea turtles, whales, seals and sea lions are often the most impacted by entanglement, any animal can be entangled by marine debris, even animals like coral and sea urchins.

ASK: What kind of items might we find during our cleanup that could potentially entangle an animal? How?

ACTIVITY: RUBBER BAND ENTANGLEMENT

OBJECTIVE: Participants will gain an understanding of entanglement by simulating what this restriction may be like for marine wildlife.

MATERIALS:

- A rubber band for each participant. The rubber bands should be an average size; they will go once around the hand. The activity will not work if rubber bands are too large. Thicker bands are more of a challenge and are less likely to snap.

INSTRUCTIONS:

1. Each participant should hang the rubber band around his/her pinky finger of one hand.
2. Each participant should then stretch the rubber band across the back of their hand, and hook the rubber band on their thumb.
3. Have participants place their other hand (without the rubber band) behind their back.
4. Have participants now attempt to free the hand "entangled" in the rubber band without using their opposite hand, teeth or any other body part.
5. Allow participants 15 seconds to attempt to free their hands of the rubber bands.

DISCUSSION:

- Prompt the discussion by "**ASKING: Were you able to free your hand from the rubber band? How did you feel while trying to remove the rubber band?**
- Explain that this activity mimics what it may be like for many marine animals when they become entangled in pieces of marine debris. Two common examples include seabirds becoming entangled in fishing line and sea turtles becoming wrapped in line, rope or other fishing gear. Explain that these animals, unlike us, do not have fingers or opposable thumbs that easily allow them to remove items.

INGESTION

"**ASK: Is there another way marine debris can hurt the ocean ecosystem or the animals living within the ocean ecosystem?**

This is where participants should be eager to describe the potential for animals to ingest (eat) debris.

- Ingestion is another negative impact of marine debris on animals. Ingestion is when something, such as food, is taken into the body. More or less, ingestion is the same thing as eating something.
- Many marine animals, such as mammals, birds and sea turtles have been known to ingest marine debris by accident.
- Marine debris is often mistaken as a food source or is attached to a food source and ingested by an animal.
- Debris ingestion poses a serious health hazard and can lead to "loss of nutrition, internal injury, intestinal blockage, starvation, and death." (NOAA)
- Plastics are the most commonly ingested form of debris.

"**ASK: What items could we collect on our cleanup that might be mistaken for food and be ingested by marine wildlife if left in the marine environment?**

ACTIVITY: FOOD OR FOE?

OBJECTIVE: Participants will come to understand how easily marine debris is mistaken for food and ingested by marine wildlife.

MATERIALS:

- Timer/stopwatch
- Vanilla pudding (1 cup per participant)
- Blue food dye
- Gummy bears (enough for about 6–8 per participant)
- Gummy worms (2 per participant)
- Container for each participant (small paper bowls work well)
- Napkins
- Spoons
- (Optional) Raisins or dried cranberries (spoonful per participant)
- (Optional) Sprinkles or Nerds candies (spoonful per participant)
- (Optional) Clean kitchen shears or knife and cutting board

SET-UP:

1. Scoop the pudding cups into individual bowls for each participant and add 2–3 drops of blue food dye to turn the pudding into an "ocean color".
2. Rinse and keep the empty pudding cups for a fun upcycling craft to be completed later in the program.
3. Cut or tear gummy worms into quarters and put 6–8 quarters into each pudding ocean.
4. Put the same amount of gummy bears into each pudding ocean. (We recommend putting worm pieces and bears of the same color into each bowl—it is more challenging this way.)
5. Add a spoonful of raisins or cranberries to each bowl and mix all of the contents.

INSTRUCTIONS:

1. Each participant should have an ocean pudding bowl, spoon and napkin.
2. Inform participants that they should refrain from eating any pieces until after the game.
3. Tell participants that they are sea turtles trying to eat jellies. The jellies are squishy and can be clear or colorful for this activity.
4. Explain that they are going to be given 20 seconds to collect as much food as they can from their pudding ocean. Instruct them to pull food out one by one, using the spoon, and place each piece on their napkins as they go. Remind them not to eat their food yet.
5. Start the 20 second feeding period, and tell the participants when to stop.
6. Instruct participants to now look at what they collected more closely and take note of how many gummy bears they collected as well as how many gummy worm pieces. They look very similar when mixed in the pudding ocean. After counting, return all pieces to the pudding ocean. *Note: raisin/cranberry pieces are added as a non-food item, such as leaves or driftwood, but may also stump some participants.
7. Now tell participants that the gummy worm pieces are actually plastic pieces, and that gummy bears are their main diet. In the second feeding period, participants should only aim to collect gummy bears—their actual food.
8. Prompt a short discussion by **ASKING: Did you collect more plastic than your actual food? How might this same situation affect marine animals like sea birds that often ingest large amounts of plastic pieces?**
9. Run the next 20 second feeding period.
10. Have participants count the number of food pieces they collected. Did they accidentally collect "plastic" pieces again? Make note of everything collected and return all pieces once more to the pudding ocean.

(continued on next page)

11. Prompt a short discussion by **ASKING: Now that you knew to avoid the plastic pieces, did you have a harder time searching for food? Did you collect fewer pieces overall than the first round because you spent more time avoiding plastic?**

12. (Optional) Finally, add a spoonful of sprinkles or Nerds candies to each participant's mix. Mix them into each pudding ocean. Explain that this new item represents microplastic pieces.

13. Repeat the last round (where participants are aiming to collect only their gummy bear food) but now they must also try to avoid microplastic pieces that will stick to everything.

14. Run the final 20 second feeding period.

15. Have participants count the number of each item they collected: food, plastics and microplastics.

16. Prompt a short discussion by **ASKING: Did you accidentally collect microplastic pieces? Were you frustrated by how many microplastic pieces there were and how they stuck to all of your food pieces?**

17. Now the game is over and participants may eat their pudding oceans if they wish!

DISCUSSION:

"SAY: Many marine animals are unable to tell the difference between food and marine debris. They often unknowingly ingest both large and small items (macro and microplastics) among other marine debris items.

"ASK: Why is this a problem for animals?

This is problematic for a number of reasons:

- Animals that eat marine debris can feel "full." However, their bellies aren't filled with the nourishing food that they need to survive, but instead they are filled with trash that cannot nourish them and may even hurt them.
- Certain marine debris items like fish hooks or sharp glass or plastic can cause serious harm to an animal when ingested and can lead to death.
- Ingested marine debris can clog the digestive pathways within animals, which can lead to their death.

For an alternate version of this activity that does not require pudding, please refer to the online activity bank.

ME AND MY COMMUNITY

"ASK: Does marine debris only affect ecosystems or does it impact other things too?

"SAY: Can we make a list of things other than ecosystems marine debris could impact?

These questions are trying to get participants to think about trash as ugly and something they don't want in their community. This is also the time to help spur discussion about the potential impact of marine debris on human health: if a small fish eats tiny pieces of plastic, then a bigger fish eats the smaller fish, and we eat bigger fish, what could that mean?

To facilitate this discussion, **"ASK: Where are some places you like to visit or vacation? Does anyone enjoy vacationing at the local landfill?**

Marine debris doesn't only affect ecosystems. It also has a negative impact on local communities, economies and even human health.

- **Tourism:** Marine debris, or trash, on the beach is not aesthetically pleasing. It negatively impacts the beauty of seashores around the world. This can make people chose other locations for vacations. For towns that rely on beach visitors, marine debris can have a negative economic impact. For example, shops may have to close because there are no longer enough visitors to buy merchandise.
- **Cleanup Costs:** To keep beaches marine debris free, many towns will spend money to remove the trash. This can cost a lot of money—thousands and even millions of dollars. This money could be spent in other ways, perhaps building playgrounds, sports fields or libraries.
- **Boat Damage:** Marine debris is often difficult to see when on a boat, and an encounter with marine debris can result in expensive damage. Large and small debris can be dangerous to boats and passengers. Large debris could crack the bottom of a boat, propellers may become entangled with fishing line, or system intakes can be clogged with a plastic bag.
- **Human Safety:** Marine debris can also be dangerous for people. Like other animals, swimmers can become entangled in debris. People can step on broken glass or needles. Passengers on boats that strike debris can be injured. Also, if people eat fish that have ingested plastics, what could that mean for our health? This is an emerging area of marine debris research, but a good start for a discussion on bioaccumulation.

Pose some or all of the following discussion questions to the participants:

- **Would you rather** visit a beach with trash or one without? Why?
- **What are some reasons** one beach may have less marine debris than another beach?
- **Do you think** an ice cream shop on a clean beach or on a beach with lots of trash would have more customers?
- **How might** a coastal economy fare if its beach is littered with marine debris?

ACTIVITY: TALKING TRASH & TAKING PRIDE

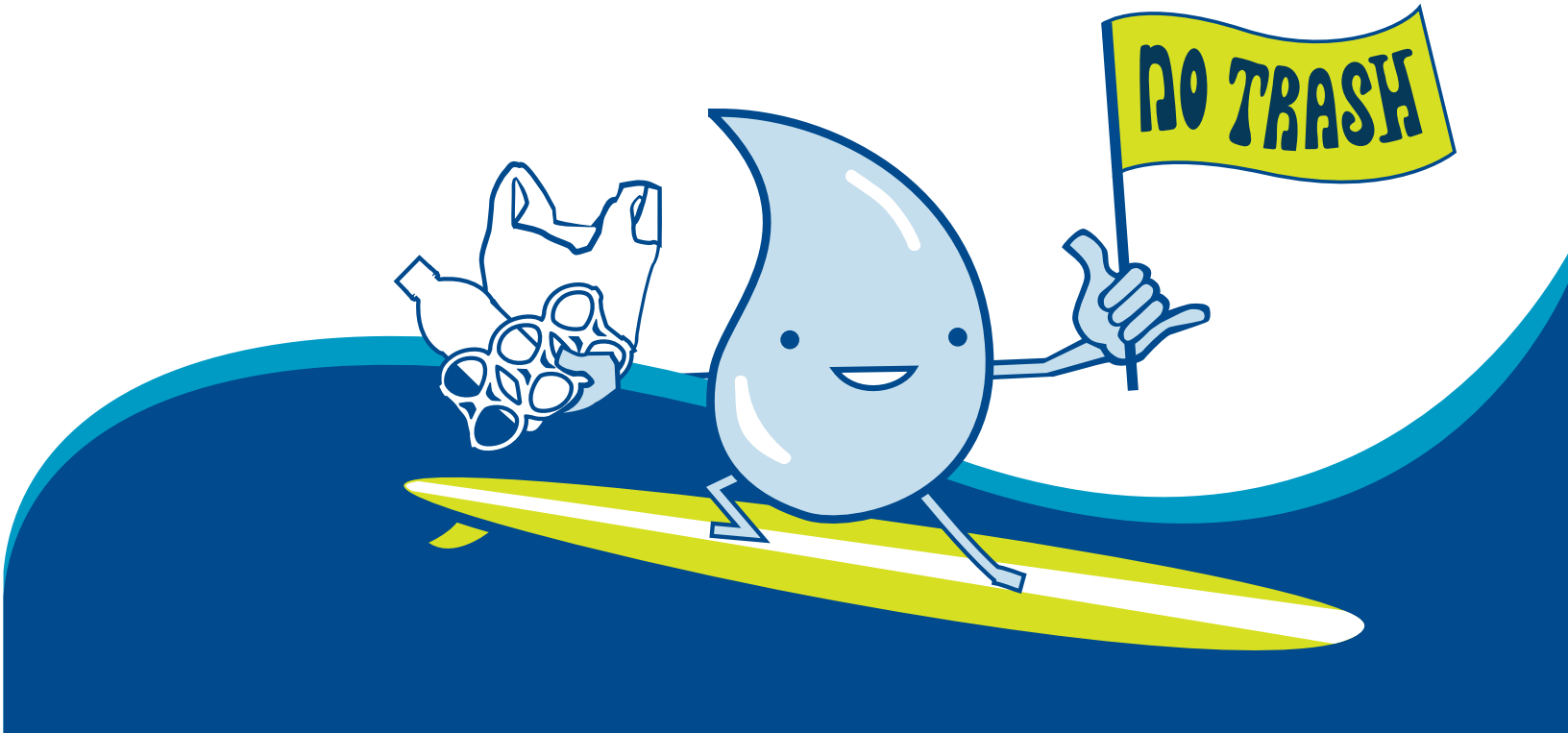
OBJECTIVE: Participants will think proactively about marine debris solutions after considering how trash could affect somewhere or something they feel significant pride towards.

MATERIALS (OPTIONAL):

- Pens/pencils/markers and paper for each participant

INSTRUCTIONS:

1. Instruct participants to think about their favorite place, person or activity.
2. Then ask participants to consider all the different ways trash and/or marine debris could impact that place, person or activity.
3. Have participants think about ways they can encourage others to take pride in this place, person or activity, and to prevent marine debris and trash from affecting this place, person or activity.
4. Ask participants to develop a catch phrase (no materials needed), poster, flag, flier or anything else they think would motivate their peers to also have pride in this favorite place, person or activity.
5. The end goal of the motivational piece is to develop broader pride so that people care enough to prevent trash and marine debris from having any negative impacts on the place, person or activity.
6. Example: A favorite activity could be surfing. The catch phrase could be: "Ride Waves NOT Waste; Put Trash in its Place!" or for soccer, a poster could have a picture of a young person kicking trash into a garbage can, and it reads: "Make the Game Winning Save, Kick the Littering Habit."



4

CLEANUP
experience

After completing the preliminary activities and information, participants should have a good understanding of marine debris. Planning and participating in a cleanup will help reinforce the ideas and principles covered in the previous section.

Planning a cleanup will enable participants to examine their local watershed, exploring what is upstream in addition to what is downstream. They will have the opportunity to learn what species are present in their local ecosystems and to make decisions on where they think their cleanup will be most impactful based on their investigations. This is all in addition to simply having the opportunity to take direct action in the battle against marine debris.

It is important to remember cleanups come in all forms. There is no need to live in close proximity to a beach, shoreline, or even water. As discussed in the previous section, the ocean is always downstream. Therefore, cleanups taking place at a local park or even a school playground are just as impactful and can reinforce the same principles as beach or river cleanups.

BEFORE THE CLEANUP

In addition to prefacing the cleanup with educational information and activities, it is also important to prepare for the cleanup itself. If time allows, it can be very rewarding for the participants to assist in the decision making process regarding where to hold the cleanup. However, if time or other situational constraints preclude participants from this step, instructors can choose a location, keeping in mind the questions below.

CHOOSE A LOCATION

To determine a great cleanup location, include participants using the following discussion prompts. These questions can be addressed individually as a take-home activity, in small groups or in a large group discussion. If time is limited, key questions are starred.

- *Where in our local community do you think would be a great place to conduct a cleanup? Why do you feel this would be a great location?
- *Would this location be safe for our entire group to collect trash?
- Can you think of any safety hazards we should be aware of before we conduct our cleanup?
- What watershed would this cleanup spot be located within?
- What is upstream from this location? What's downstream?
- *Where could the trash in this location have come from? Where would trash in this location end up? (Ask if participants need assistance with the preceding question.)
- How would trash in this area affect the surrounding environment?
- *What animals or plants might be affected by trash in this location?
- Are there any endangered or threatened species that could be impacted by our cleanup?
- *How might humans be affected (think homes, stores, schools, etc.)?
- If we host a cleanup in this location, could our actions have any negative impacts? What should we do to prevent harming the environment while we are conducting the cleanup?
- What will we do with the trash once we clean it up?

The goal of this discussion is to determine a great cleanup location. The location should be safe. If the location you wish to clean is a park, marina, private property, etc., make sure to contact the site and ask for permission to have a cleanup there on your desired date and ensure you don't need any permits. Ask the park or other site contact where the collected trash should be disposed. Most sites will offer to collect the trash and dispose of it for you. Other sites may have a dumpster on site where trash can be left, but in some cases, it may be necessary to contact a waste management organization to help dispose of the trash properly. Once you have permission, permits (if applicable) and a waste disposal plan, it is important to prepare for the cleanup day. Follow these steps to be completely prepared for the cleanup.

BE PREPARED

1. Visit the cleanup site in advance to determine:

- **A.** Where to set up a "home base" or meeting point
- **B.** Where to leave bags of trash and recyclables
- **C.** What areas participants will clean

2. Get your supplies. For a successful cleanup, you will need:

- **A.** Trash bags (or have participants bring reusable containers, like buckets)
- **B.** Gloves (gardening gloves or disposable latex-free gloves) for participants (or have them bring their own gloves)
- **C.** Container for sharp or hazardous items.
- **D.** Cleanup data forms to record the items picked up (included in this packet)
- **E.** Pens or pencils
- **F.** A first-aid kit for minor cuts and scrapes
- **G.** A water cooler with enough water to keep all participants hydrated, especially in warm temperatures
- **H.** Optional: If you have a few clipboards, these are helpful for holding data forms.
- **I.** Optional: If you have a fish or a luggage scale (a scale with a hook) at home, you can use it to weigh the trash you collect.

3. **For the safety of you and your participants,** keep the following in mind:

A. Review what to do in case of a health emergency (heat exhaustion or heatstroke, broken bone, etc.). It might be helpful to have another leader on hand that has basic medical training or knows first aid.

B. When visiting the site, look for natural and man-made safety hazards, such as rocky areas, highly variable tides, poisonous plants, high-speed roads, power lines, etc. If necessary, inform participants that they may need to dress accordingly, such as wearing long pants or closed-toed shoes.

C. Plan ahead for handling sharp items, including syringes or pieces of broken glass. We recommend disposing of these items in a container with a tight screw lid, such as an empty liquid laundry detergent bottle that you have clearly labeled. Ask younger participants to point these objects out to an adult so they can be disposed of properly.

D. Find out how to contact the local Fish and Wildlife Service office in case you encounter any dead, entangled or injured wildlife. You can report these finds on your data form, but be sure to leave any wildlife handling to the experts.

GUIDANCE FOR COMPLIANCE

The following best practices are generally used for NOAA Marine Debris Program (MDP) activities to ensure compliance with applicable laws for environmental protection and to minimize or avoid potential impacts on environmental resources. Some practices are species, location, and seasonal dependent and may have been developed in consultation with the National Marine Fisheries Service (NMFS) or the United States Fish and Wildlife Service (FWS).

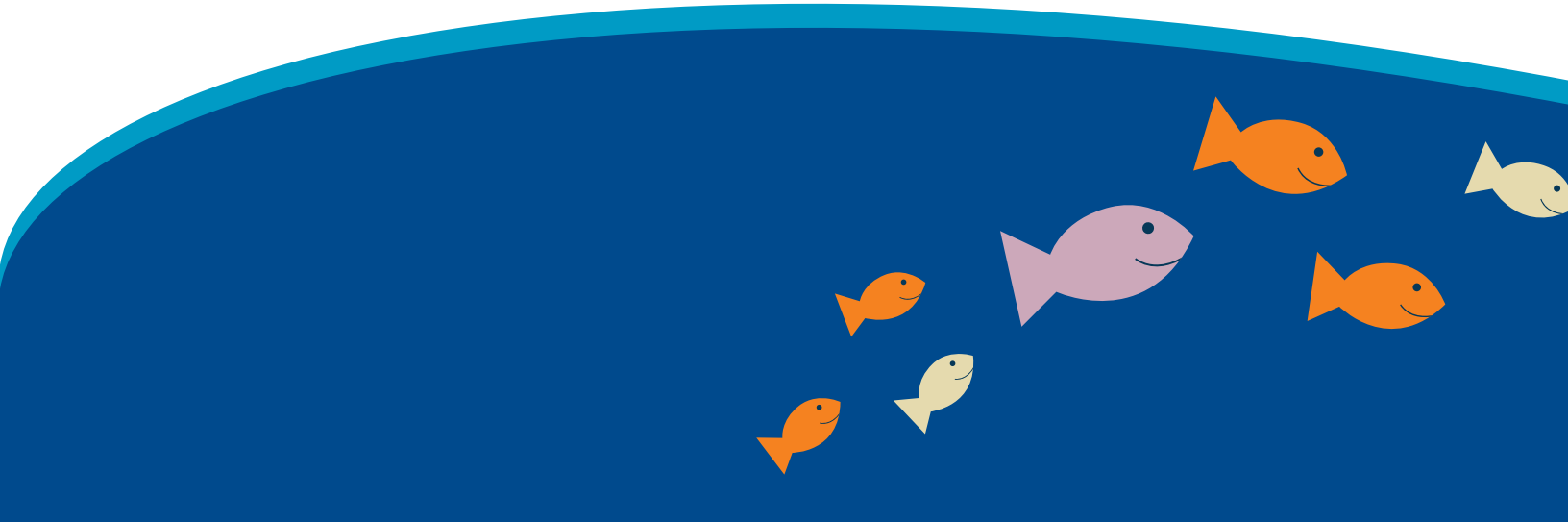
- **General Conservation:** All activities avoid or conserve the habitat of any endangered or threatened species. This may include using buffer areas around sensitive resources (e.g., rare plants or archeological sites would be pre-identified and avoided). Other examples include not coming within three nautical miles of a Steller sea lion critical habitat without applicable federal permits; observing a buffer of at least 100 yards from an endangered species rookery; avoiding salmon spawning areas during spawning season; and avoiding piping plover nesting areas during nesting season.
- **Project Timing:** Timing of activities would be limited to periods when important species are least likely to be in the project area (e.g., pre-determined windows of time when anadromous fish are not expected to be utilizing the project area) to minimize any potential impacts to living marine resources. Actions are limited to times when vulnerable life history stages of protected species are not present to avoid potential adverse impacts on that life stage and overall to minimize adverse impacts to that species. The MDP would consult with the NMFS Office of Protected Resources (OPR) before working in areas that are known to be utilized by endangered fish or other animals.
- **Sea Turtles:** Sea turtles are susceptible to artificial lighting that is visible from the beach, barriers on the beach, and disturbance of the nest site by humans and predators. Avoid using light when possible; otherwise shield the light so it does not reach the beach. Minimize physical disturbance of beach material to reduce the likelihood of adverse impact to a sea turtle nest. Use animal-proof waste containers to minimize attraction of non-native predators to beach areas.

DURING THE CLEANUP

To ensure a smooth and successful cleanup experience, be as prepared as possible before participants arrive. Designate your check-in station/meeting point and trash drop-off location.

Once on site, be sure to address the following before starting the clean-up:

- **Emphasize the importance** of safety. Instruct participants to stay in groups and within eye and voice contact of adults. This can NOT be an individual activity.
- **Point out any safety hazards** and recommend how to avoid these hazards. Remind participants what to do when they encounter items such as sharp objects or dead, entangled or injured animals. Younger participants should not touch any sharp items; have participants point these items out to an adult who will safely dispose of the item.
- **Remind students** they are scientists for the day: Today we are all scientists! As scientists, we must collect data while cleaning up. The data we collect will not only tell us more about what items we are finding locally, but will also be added together with data from around the world to create a global picture of the marine debris problem. These data will help us think about local solutions to marine debris. Ask participants to use tick marks to record debris items; words such as "lots" and "many" are not useful for data analysis.
- **To make data collection easier,** participants should work in small teams with each team focused on one data card.
- **If you have other leaders' assistance,** establish a point-person to stay at the meeting place so there is always one person to handle questions, late arrivals, emergencies, etc.
- **Inform participants** what to do with the filled bags of trash, and set an end time for the cleanup so that everyone returns together.
- **Take before and after photos** of the cleanup site as well as photos of your participants in action and a final group picture with all of the trash collected. One of the best parts of a cleanup is documenting the participants' impact.
- **Optional:** If you have a scale with a hook, use it to weigh the trash collected. This can be done at the end as a group or as participants return with full trash bags. If you don't have a scale, you can use a standard conversion of 15 pounds per trash bag to estimate the overall weight of your collected trash.
- **As the participants finish,** collect all completed data forms. Make sure participants note how many people worked on each card.
- **All Preventing Ocean Trash activities** can take place at the cleanup site, once all participants have returned to the meeting spot. If short on time, conduct a short group discussion with participants about their initial reactions to the cleanup and the items they collected. Discussion prompts are provided in the next section.
- **When the group is ready** to leave, ensure all trash is either left at a designated drop-off location or taken with you to dispose of properly. No materials should be left behind.



AFTER THE CLEANUP

When your cleanup is over, be sure to collect all of the data forms so that the information can be returned to Ocean Conservancy. At the completion of the Talking Trash & Taking Action program, please send data cards, pre- and post-survey results, and any other pictures, stories, or reactions to the following address.

Email: cleanup@oceanconservancy.org

Mail: Ocean Conservancy
Attn: Talking Trash & Taking Action
1300 19th St NW, 8th Floor
Washington, DC 20036

Data from cleanups around the world, including yours, can be seen at coastalcleanupdata.org. Sign in as a guest to check out data from hundreds of different cleanup sites across the globe.

Turn to the final chapter for concluding discussion topics and activities for participants following the cleanup.

5

preventing

OCEAN TRASH

OBJECTIVES:

1. To Discuss Reactions to the Cleanup Experience
2. To Relate to the Items Collected and Their Journey
3. To Think Creatively and Critically about Ocean Trash Prevention

REACTING AND RELATING TO CLEANUP

Now that participants have learned all about marine debris and conducted their own cleanup, it is important for individuals to share their reactions to the cleanup experience. This will help conclude the program and move participants to focus on marine debris prevention. Participants now have hands-on experience with the information discussed throughout the Preliminary activities and should be ready to discuss the issue in an action oriented and prevention focused way.

“ **ASK** the participants:

- **How did this experience make you feel?**
- **Did you feel frustrated? Surprised? Motivated?**
- **Were you surprised by some of the items found?**
- **Which items surprised you the most? Why?**
- **Were you surprised by the quantity (amount) of certain items?** If you have time to total participants' data forms before the discussion, “ **ASK: Were you surprised by the top 5 collected?**
- **How many of the items you collected do you recognize? Do you use many of these items at home? Could any of the items be found in your lunch box?**

ACTIVITY: TALKING CRAZY TRASH

This activity can be conducted as a group at the cleanup site, directly following the cleanup and discussion, individually as a take home activity, or in the days following the cleanup in small groups.

OBJECTIVE: Participants will think critically about the journey of trash and how a specific item could have not become marine debris.

MATERIALS:

- Participants' memory of the craziest, weirdest item they collected
- (Optional) Pen/pencils/markers
- (Optional) Paper
- (Optional) Device for audio and/or video recording (can be a smart phone)
- (Optional) White board and dry erase markers

INSTRUCTIONS:

1. Have participants break into small groups (can be done individually if preferred).
2. Once in small groups, have participants share what was the craziest or weirdest item they collected during the cleanup. It is not necessary for the item to be very strange; any item will work.
3. Ask each group to pick one of the items participants shared.
4. Explain to participants that they will be creating the story of that item's journey. Most importantly, they will conclude the story with how they would have become Ocean Heroes and stopped that item from ending up where it was collected by the group.
5. Participants can choose how they would like to tell the story. They can write an actual story or poem, create a comic strip, write lyrics to a song or rap, act out the journey as a skit, or even make a video.

TRASH MATH: DIVE DEEPER WITH DATA

Following the Cleanup, organizing and analyzing the data can help participants understand the specific marine debris problems in your area and enhance math skills. Once trash data have been collected, participants can use these data to run age appropriate statistics and calculations. They might determine the most common item collected or look at the mean, median and mode of certain items across the group. These data can also be graphed, made into a pie chart, or analyzed with a multitude of different math calculations. Participants can calculate totals, percentages, ratios, averages, probability, etc. For an example math worksheet using the cleanup data, please see the online activity bank.

MARINE DEBRIS PREVENTION

Conducting cleanups is a great way to collect items that have already become marine debris and prevent them from traveling further down the watershed or throughout our ocean. However, cleanups are not a long term solution to the problem of marine debris. If proactive steps are not taken to start to change behavior and address trash before it becomes marine debris, we will continuously have to conduct more and more cleanups. Through increased prevention strategies, cleanups would ideally become unnecessary. Therefore, Talking Trash & Taking Action concludes by engaging participants in a multitude of marine debris prevention strategies.

SAY: Since we have started talking about being Ocean Heroes by preventing trash from entering our waterways, let's discuss prevention further.

ASK: Can anyone define *prevention* or give us an example of one way to prevent marine debris?

Prevention: the act or practice of stopping something bad from happening

SAY: Let's start with some simple prevention techniques. Who has heard of the three R's?

1. **Reduce:** to make smaller or less in amount, degree or size

   We can: Reduce the amount of trash produced by decreasing the amount of disposable items we use. Replacing a single-use item with a reusable item, such as a water bottle or grocery bag, will reduce the amount of items that could eventually end up in the ocean.

2. **Reuse:** to use again especially in a different way or after reclaiming or reprocessing

   We can: Find a way to reuse trash instead of throwing it away. Reuse items for the original purpose, repurpose them into something new, or donate them.

3. **Recycle:** to make something new from something that has been used before; to convert waste into a reusable material

   We can: Learn about all the products that are recyclable in our area. Whether at home, at school or on the go, make sure your plastics, glass, metals, cardboard and papers are properly disposed of in recycling receptacles. To help understand plastics recycling, share the "Recycling Decoder", found in the back of this book.

ASK: Can you think of more ways to prevent marine debris? Let's list as many prevention ideas as we can.

To help with this, ask participants to think back to the discussion about marine debris sources and to be creative. Here are some additional examples:

- **Upcycle:** Take something that might have been thrown away or recycled and create something new and better with it. Repurpose it or use it for an art project.
- **Good trash practices:** Always use proper trash and recycling receptacles that are not overfilled. Pick up trash from the ground when you can and never litter.
- **Innovation:** Support establishments that use innovative ways to avoid single-use items, such as utilizing all compostable products or providing pasta, like spaghetti, instead of plastic stirrers for coffee. Or create your own innovative ways to prevent marine debris.
- **Educate others:** Talk to friends and family about what you have learned about marine debris and how to prevent it. We are all responsible for this issue, and we can all help prevent marine debris.
- **Proper Waste Management:** Ensure that trash cans (inside and outside) don't become overfilled so trash won't easily escape.
- **Increased Disposal Availability:** By making proper disposal and removal of trash more available and increasing incentives for proper disposal, waste management companies can help prevent intentional dumping of waste into the marine environment.
- **Storm Water Drainage:** Storm water stenciling programs help control storm water discharge and prevent marine debris from traveling. Also, installing something called a catchment device can trap trash before it enters the storm drain or as it is traveling down streams.
- **Government Action:** Programs and laws enacted and regulated by larger bodies such as government agencies help prevent acts such as marine dumping. One example is the International Convention for the Prevention of Pollution from Ships, now known universally as MARPOL. MARPOL includes regulations aimed at preventing and minimizing pollution, including trash, from ships (International Maritime Organization).

ACTIVITY: PREVENTION CORNERS

OBJECTIVE: Participants will examine different prevention methods as they pertain to particular items of marine debris and think creatively on multiple options for marine debris prevention.

MATERIALS:

- White Debris Deck, can also use Grey Debris Deck, if needed
- Open space or room to clearly divide into four corners
- (Optional) Half sheets of paper to make "signs" to label the four categories: Reduce, Reuse, Recycle, Other

INSTRUCTIONS:

1. Pass a marine debris item card to each participant.
2. In an open space, designate four separate spaces or corners and label these the 3 R's: "Reduce", "Reuse" and "Recycle" plus one "Other" spot.
3. Explain the "Other" corner includes any of the ideas listed a few minutes ago and provides the chance to be creative when thinking about marine debris prevention.
4. Explain to participants that they must choose one of the corners as an alternative outcome for their item, instead of becoming marine debris. For instance, someone with "grocery bag" might choose the "Reduce" corner while someone with "beverage bottle" might choose the "Recycle" group.
5. Provide participants with about 2–3 minutes to move to their desired outcome corner, based on their individual items.

DISCUSSION:

- Ask each participant to explain his or her choice for that marine debris item. Start in one corner and work around to all four categories. You can prompt students with these questions:

  "ASK:
  - **What is your item?**
  - **Why did you choose this corner?**
  - **If you chose "Reduce" or "Reuse," how would you reduce/reuse that item in a different way?**
  - **If you chose "Other," what outcome did you come up with for your item?** This can be as simple or creative as participants wish. For instance, someone with "microwave" may simply state "dispose of responsibly" or a participant with cigarette butts may say "outlaw smoking."
- Explain to participants there is no right or wrong answer. All of the items could go into multiple categories.
- (Optional) Provide students an additional 2 minutes to choose a new category for their item and repeat the discussion prompts with a couple of the participants.

ACTIVITY (TAKE-HOME): UPCYCLING CRAFT PROJECT

A day or two before this activity, ask participants to start saving cool trash or recycling items from home like empty plastic bottles, bottle caps, soda cans, tissue boxes, etc. Advise them to wash and dry items thoroughly and bring the clean items for an activity.

(Optional) Before your cleanup, remind participants to keep cool or interesting items out so they can be cleaned and used for an upcycling activity.

For additional upcycling craft ideas, please refer to the activity bank online.

OBJECTIVE: Participants will learn about the art of upcycling and how to take items that normally would be thrown away and repurpose them into an arts and crafts project.

MATERIALS:

- Plastic bottle caps varying in sizes and colors
- Permanent markers
- Googley eyes (preferably with sticker backs)
- Scrap/recycled paper
- Glue (if using pipe cleaners or magnet strips)
- (Optional) Pipe Cleaners
- (Optional) Magnet strips

INSTRUCTIONS:

1. Allow each participant to select one or two bottle caps.
2. Pass out the decorating supplies (googley eyes, markers, etc.)
3. Show examples of already made bottle cap monsters/faces.
4. Allow participants to decorate their bottle caps using their own creative ideas.
5. Assist younger participants with permanent markers!
6. Use self-adhesive round magnets, or use the following instructions with magnetic tape.
    - Pass out strips of 1" pre-cut magnet strips along with two bottle caps, one smaller than the other.
    - Glue the smaller of the bottle caps face up inside the other cap to create a platform on which the magnet strip can be stuck.
    - Have participants decorate the front of the bottle cap however they'd like using the art supplies.
    - Stick the magnet strip to the back (onto the second bottle cap) to create a magnet.
7. See activity bank for other bottle cap upcycling ideas.

6 post-SURVEY

Objective: The Post-Survey is to gauge how much participants learned about marine debris. These are the same questions participants were asked at the beginning of the program. The answers will be used solely to understand if marine debris knowledge increased after participating in the Talking Trash & Taking Action program.

INSTRUCTIONS

1. The survey can be conducted individually or as a group.
2. Explain that this survey is not being graded; it is simply for Ocean Conservancy and all of us (participants) to see how much we learned by participating in this program.
3. If conducting individually: ask participants to fill out the survey. It can be completed anonymously so participants do not think they are getting graded on the activity. Collect the surveys to send back to Ocean Conservancy.
4. If completing as a group: ask participants to put their heads down or cover their eyes. They should raise their hand when they think they hear the correct answer. Write down the number of responses for each answer to compare to the results of the Pre-Survey.
5. Reveal to the group how much they learned over the course of this program by going over the answers and comparing the number of correct answers to the first time participants completed the survey.

SURVEY

Please refer to Pre-/Post-Survey on page 5.

ANSWER KEY

1. D | 2. D | 3. True | 4. B | 5. A | 6. True | 7. D | 8. A | 9. B | 10. False

7

conclusion

Thank you very much for participating in Talking Trash & Taking Action. We sincerely hope you and all the participants enjoyed exploring ocean trash. Everyone should be incredibly proud of their journey, having learned about ocean trash and feeling empowered to prevent it.

NEXT STEPS:

Please send Pre- and Post-Survey results, a summary data card (with totals and Cleanup location information included) and any reactions, stories, comments, photos, etc. that you would like to share with Ocean Conservancy to: Cleanup@oceanconservancy.org or

Ocean Conservancy
Attn: Talking Trash & Taking Action
1300 19th Street NW
8th Floor
Washington, DC 20036

Once Ocean Conservancy receives survey results and data cards, we will send enough patches or key chains for all participants.

Please stay in touch. Every time you complete Talking Trash & Taking Action, let us know. Ocean Conservancy would like to provide as much assistance as possible to help educate our future generations. If you have questions, comments, stories or suggestions, we would love to hear them. Please send them to one of the addresses above.

Celebrate & Share! Share your experiences with Talking Trash & Taking Action with friends and family or on social media. The more we all know about ocean trash, the more we all can have an impact!

8

vocabulary

- **Bioaccumulation:** the accumulation of a substance (as a pesticide) in a living organism [1]
- **Biodegrade:** capable of being slowly destroyed and broken down into very small parts by natural processes, bacteria, etc. [1]
- **Composition:** the way in which something is put together or arranged; the combination of parts or elements that make up something [1]
- **Decomposition:** the process of breaking down into pieces or simpler elements by natural processes, chemicals, or some other force [1]
- **Eddy:** a circular current of water or air [1]
- **Entangle:** to cause (something) to get caught in or twisted with something else [1]
- **Ghostfishing:** lost or abandoned fishing gear that continues to catch fish [2]
- **Gyre:** large system of rotating ocean currents that spiral around a central point [3]
- **Ingest:** to take (something, such as food) into your body; to swallow (something) [1]
- **Litter:** Rubbish such as paper, tins, and bottles left lying in an open or public place [4]
- **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; trash and other solid material that enters oceans and coastal waters [3, 5]
- **Microplastics:** pieces of plastic that are less than 5mm long; Microplastics are often created by the breakdown of larger pieces of plastic over time. They can also be manufactured. For example, pre-production industrial plastic resin pellets (nurdles) or plastic "micro-scrubbers" in face wash are considered microplastics. [3]
- **Photodegrade:** to be broken down by the action of light, especially sunlight [4]
- **Prevention:** the act or practice of stopping something from happening or existing [1]
- **Recycle:** to make something new from something that has been used before; to convert waste into a reusable material [1, 4]
- **Red tide:** a harmful algal bloom that occurs when colonies of algae grow out of control and discolor water while producing toxic or harmful effects on people, fish, shellfish, marine mammals, and birds [3]
- **Reduce:** to make smaller or less in amount, degree or size [4]
- **Reuse:** to use again especially in a different way or after reclaiming or reprocessing; to use more than once [1, 4]
- **Source:** a place, person, or thing from which something comes from or can be obtained [4]
- **Upcycle:** to reuse discarded objects or material in such a way as to create a product of a higher quality or value than the original, for example, upcycled art or upcycled furniture [4]
- **Watershed:** the area of land where all of the water that is under it or drains off of it goes into the same place [5]

SOURCES: [1] Merriam-Webster; [2] Food and Agriculture Organization of the United Nations; [3] NOAA; [4] Oxford Dictionaries; [5] EPA

Ocean Conservancy