

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: 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).