



## KIDS ENVIRONMENTAL LESSON PLANS

This lesson plan developed by:



# Biomagnification Game

### Overview:

This is a tag-inspired game that demonstrates the concept of biomagnification as it relates to plastics and how chemicals and plastics can make it onto our dinner plates.

### Ocean Literacy Principles:

1. The Earth has one big ocean with many features
5. The ocean supports a great diversity of life and ecosystems
6. The ocean and humans are inextricably interconnected
7. The ocean is largely unexplored

### Key Concepts:

Though this game has a fun tag-like element to it, students should come away with an understanding of the food chain, that what the smallest fish eat is significant, and that plastics at sea photo-degrade rather than biodegrade. Finally students should come away from this activity with an inspiration and awareness concerning their own use and disposal of plastics.

### Materials:

Per student:

- Small pieces of plastic (such as bottle caps or cut-offs from a plastic water or detergent bottle, be sure none have sharp edges). They need to be small enough so that the students can hide them in their hand. You will need at least 2 per person in your group.
- Venue should have enough room for the group to run around and be free of obstacles and tripping hazards.

# Biomagnification (cont.)

**Set-up Prior to Activity:**

Designate the area for tag (there is no safety zone) as well as an area where the class can gather to discuss the results.

**Duration:**

15-20 min

**Physical Activity:**

High (running and tag)

**Background:**

Plastics, toxic chemicals and heavy metals flow into the ocean when industrial, agricultural, and human wastes run off or is deliberately discharged into rivers that empty into the seas. These pollutants can be harmful, especially to animals near the top of the food chain because of the process biomagnification. Biomagnification is the increasing concentration of a substance in the tissues of organisms at successively higher levels in the food chain.

**Activity:**

1. Designate 2-3 students, depending on class size, to be fishermen.
2. Choose 4-5 students to be salmon.
3. The rest (should be the majority) are krill. Bring the krill to the side and give each some of the plastic pieces (the salmon and fishermen should not know what you are doing). Distribute the plastic among the krill unevenly (some may have 4 pieces, some only 1).
4. In the first round, put the salmon and krill in the boundary. At go, the salmon should run around and try to eat (tag) the krill. They should link arms with the krill they catch. Once all krill are eaten, begin the second round.
5. In the second round, the fishermen now go in and try and catch (tag) as many salmon as they can (keep the salmon linked to the krill they have tagged so everyone is now in the boundary and in the game).
6. After all of the salmon/krill have been caught, sit them in groups: fishermen, then the salmon they caught, and the krill eaten by the salmon. Have the krill pass their plastic pieces to the salmon who caught them. Then, have the salmon pass their plastic pieces (now piles) to the fishermen. At this point each of the fishermen should have a significant pile of plastic in front of them.
7. Go down each line and have each piece of krill say out loud how many pieces of plastic it had 'eaten' before being caught by a salmon.

**Discussion:**

1. What do these piles of plastics in front of each fisherman mean? How did this happen?
2. How did the plastics get there? Why?
3. What are the implications for the people who eat this salmon?
4. Discuss the concept of biomagnification and how important the health and habitat of even the lowest part of the food chain is to the big picture.

# Biomagnification (cont.)



5. Discuss the concept that plastic does not dissolve or disappear in the marine environment. Rather, plastic breaks down into smaller and smaller pieces that end up suspended in the water column and are ingested by even the smallest sea creatures.
6. Ask the group if biomagnification could be happening with other types of pollution (in addition to plastics)?
7. Discuss the fact that the same happens when chemicals, medicine and drugs, oils and other hazardous substances are dumped into the ocean.
8. Discuss the sources of plastic pollution in the water and methods to prevent and reduce plastics from ending up in the sea.
9. *Wrap up by recycling the plastic pieces.*

## More information:

This game was developed by Laura Dunphy and Rachael Miller of Rozalia Project for a Clean Ocean. To learn about what Rozalia project is doing to clean up the oceans as well as find information and resources about marine debris, see [www.rozaliaproject.org](http://www.rozaliaproject.org).

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