

# BIOMAGNIFICATION DIAGRAM

## Background

This is a display that shows the damages and effects of improper dumping. Biomagnification shows that the higher a species is on the food chain, the higher percentage of chemicals it will consume from eating the lower trophic level animal. When humans dump waste such as chemicals, small fish and plankton will consume a large amount of it. As the smaller animals get eaten, the amount of chemicals that get passed along become greater and greater. Thus, bad chemicals come back around to humans, who receive the highest percentage of it. It is important to understand this process because humans are not only harming other species by dumping waste, but harming themselves as well.

## Supplies

- 1 Shoebox and lid
- 2 pieces of dark blue paper
- 1 piece of light blue paper
- 1 piece of brown construction paper
- 1 transparent sheet
- Clear tape
- Scissors
- Glue
- Black sharpie or marker

## Instructions

**Step 1:** Take a shoebox, and put the lid under the box so it stands upright (see Figure 1).

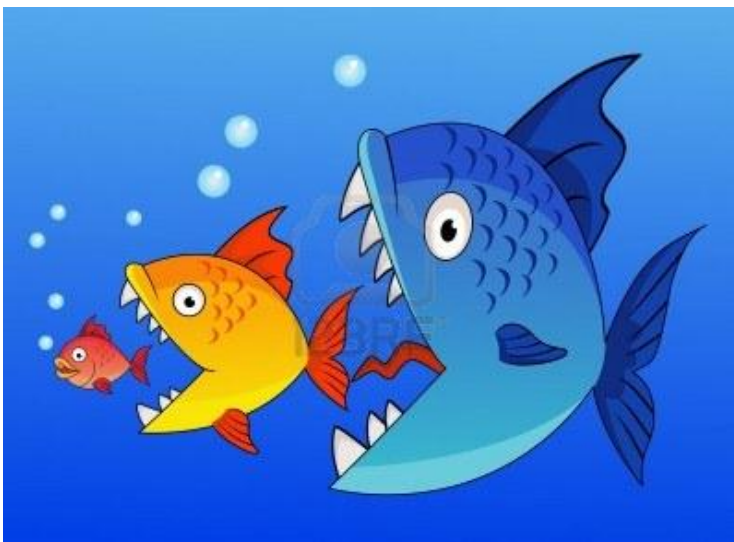
**Step 2:** The lower half of your display will represent the ocean. Cut and paste the dark blue construction paper to cover the lid and bottom half of the box.

**Step 3:** The upper half of the display will represent the sky. Cut and paste the light blue construction paper to fit around the upper half of the vertical box (and sides).

**Step 4:** Cut out fish from the picture below. Paste the smallest fish in the bottom-left area of the vertical box, the middle fish in the bottom-middle, and the biggest fish in the bottom-right.



**Figure 1.** How to lay your shoebox pieces so that the lid serves as a platform.



**Step 5:** With a black sharpie/marker, draw a small black arrow going from the small fish to the medium fish. Then draw a bigger arrow from the medium fish to the large fish. Lastly, draw an even bigger arrow from the biggest fish going up-right, where the future boat will be.

**Step 6:** Over the small fish, write “1 ppm” with the marker, then “5 ppm” over the middle fish, “15 ppm” over the large fish, and “30 ppm” over the humans. These numbers represent the amount of chemicals getting passed along the food chain. As you can see the numbers are greatly increasing, hence the term biomagnification.

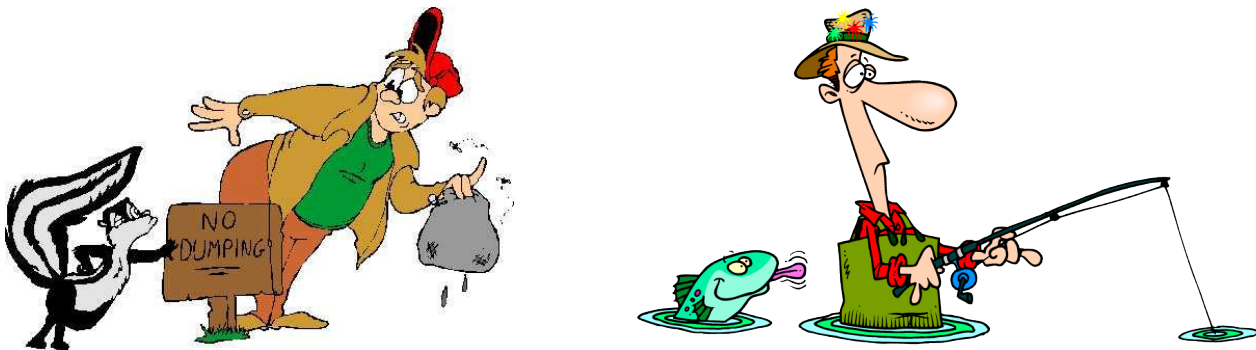
**Step 7 (optional):** Cut and paste the sun in your light blue sky.



**Step 8:** Paste/staple transparent sheet at the intersection between the light blue and dark blue construction paper. Use the clear tape to tape the sides of the transparent sheet to the shoebox.

**Step 9:** Make the boat out of a brown piece of construction paper. See page 3 for origami instruction. You may also cut out the outline of a boat instead.

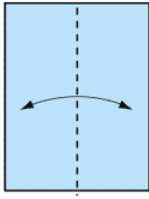
**Step 10:** Cut out the humans (and what they are holding) from the pictures shown below. Paste them on the boat. The man dumping trash on the left of the boat (should also be pasted to the back of the shoebox); the fisherman on the right.



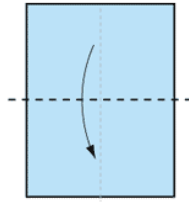
**Step 11:** Explain to volunteers how transferred chemicals increase from food level to food level. Therefore humans are affected the most by their own waste. Cleanups are important so waste does not reach marine animals that become contaminated, and eventually come back to contaminate us.



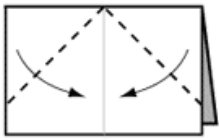
## HOW TO FOLD AN ORIGAMI BOAT:



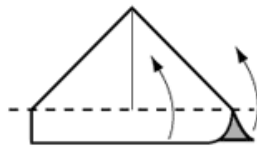
1. Start with a rectangular piece of paper, coloured side up. Fold in half, then open.



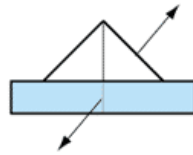
2. Fold in half downwards.



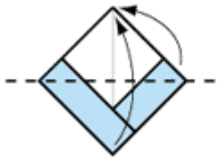
3. Bring corners in to centre line.



4. Fold uppermost layer upwards & do the same to the back. Crease well.



5. Pull the sides out and flatten.



6. Fold front layer up to top, & do the same to the back.



7. Pull the sides outwards and flatten.



8. Gently pull the top parts of the model outwards, making a boat shape.



9. Flatten well to crease all folds. Then open out slightly, forming a boat shape. Finished Boat.