

Lab: Puzzling Pollution

(adapted from Cabrillo Marine Aquarium)

Background: Baleen whales feed on crustaceans such as amphipods, copepods and krill, as well as small fish. With changes in ocean temperature, upwelling, acidification and other human introduced pollutants, whales can be impacted through the food web. In some cases, such as temperature rise and acidification, a decrease in whale prey can lead to population decreases. In other cases, such as mercury or persistent organic pollutants, whales can be harmed by the biomagnifications of these toxins up the food chain. This game demonstrates the relationship between trophic levels of a food web and the impact of humans on those trophic levels.

Materials: 21 green blocks (phytoplankton), 12 blue blocks (zooplankton), 12 red blocks (krill), 1 yellow block (whale), 1 set of playing cards

Prelab Questions:

1. Describe characteristics of a Baleen whale. Name the suborder and an example of a Baleen whale.
2. Explain the difference between bioaccumulation and biomagnification.
3. How might creatures as large as whales be affected by small pollutants?

Procedure:

- a. Place three green blocks side-by-side with the pictures facing out. Place three more green blocks on top of - and perpendicular to - the first layer. Continue this process until you have stacked all the green blocks.
- b. Stack all of the blue blocks on top of the green blocks in the same pattern.
- c. Stack all of the red blocks on top of the blue blocks in the same pattern.
- d. Place the yellow block on the top of your structure.
- e. Shuffle the playing cards and place them upside down in front of you.

Play!

- f. Player one draws a playing card, reads it aloud, and follows the instructions written on it. When removing a block, only the block being removed may be touched. (You are not allowed to hold the rest of the stack together while you remove a block)
- g. Place used playing cards into a discard pile.
- h. Moving clockwise around the group, each player draws a card then follows the directions.
- i. Continue until the tower falls or all the cards are used up. If the tower falls, the group loses. If the tower still stands when all the cards are used up, the group wins. (What do you win? You win the satisfaction of having done so!)
- j. Time pending, play again!

Postlab Questions:

4. What factors determined whether your group won the game?
5. Describe factors (cards) that were beneficial to keeping the food web intact.
6. Describe factors (cards) that were detrimental to keeping the food web intact.
7. What other nekton might be affected by this type of food web?
8. How would humans be affected by a collapse of this food web?
9. How might these human impacts be minimized in ocean habitats?
10. How does the game differ when played multiple times?