OREGON MARINE SCIENTIST AND EDUCATOR ALLIANCE

# Food Chains and Biomagnification - Teacher Key

## Sea Lion Feeding Frenzy

**Directions:** Research one ocean food chain that includes a producer, a primary consumer, a secondary (and tertiary, if applicable) consumer, and an apex (or top) predator. Identify the organisms in this food chain, then draw your food chain using arrows to represent the flow of energy. Respond to the questions on the second page and represent the concept of biomagnification in your food chain.

Teachers: there are many possible food chains students can use for this activity. The following is just one example you can use with your students.

1. **Ocean food chain organisms:**
   a. **Producer:** ___plankton_____
   b. **Primary Consumer:** ___krill_____
   c. **Secondary Consumer:** ____silverfish_____
   a. **Tertiary consumer (if applicable):** ____leopard seal_____
   d. **Apex (Top) Predator:**
      ___orca_____
2. **Draw your food chain below:**

Students should include the names and pictures (if possible) of each organism in the food chain. They should include arrows showing the direction the energy flows when one organism eats another.

**3. What is biomagnification, and how does it function in this ecosystem?**

Biomagnification is the process by which substances become more concentrated in the bodies of consumers as one moves up the food chain (trophic levels). Producers at the bottom of the food chain (plankton) absorb a certain number of contaminants from the environment. The first level consumers (krill) eat the contaminated producers and store most of the contaminants from eating. Contaminants can accumulate in an individual organism over time when they don't get broken down. Second level consumers eat the contaminated organisms lower on the food chain and store the contaminants in their body tissues. By the time the apex predator eats the second or third level consumers, they end up with the highest concentrations of contaminants due to biomagnification.

**4. Add toxins to your food chain to visually represent biomagnification in this ecosystem.**

Use the image on the last slide of the Bioaccumulation and Biomagnification presentation to help students with this. They can represent toxin levels by adding dots or showing levels in each organism, or any other way that models the concept of how the concentration of contaminants increases higher up the food chain.

**5. How have you represented this concept visually in your food chain? In which organism is the concentration of toxins the greatest?**

Answers may vary. Students should describe how they modeled biomagnification in their food chain. Did they use dots, levels, something else?

The concentration of toxins should be the greatest at the top of the food chain.