

Name: \_\_\_\_\_

Period: \_\_\_\_\_

### **Biomagnification and Bioaccumulation Activity**

*Bioaccumulation* is when an organism accumulates a material in its body at a concentration greater than the environment. *Biomagnification* occurs when bioaccumulation occurs in several links in a food chain. A consumer (of any level) has to consume a lot of biomass from the lower trophic level. If that biomass contains the pollutant, the pollutant will be taken up in large quantities by the consumer.

This can happen when the material is:

1. long-lived (does not degrade, or is not easily broken down by organisms).
2. concentrated in the organism's body (is not excreted).

This often occurs with pollutants soluble in fat. Water-soluble pollutants usually cannot biomagnify in this way because they would dissolve in the bodily fluids of the consumer. Examples of biomagnification include organic compounds (e.g. DDT, PCBs) and heavy metals. In the early 1960's scientist Rachel Carson published "Silent Spring" which led to the banning of DDT, the search for pesticides that would not biomagnify, and the birth of the "modern" environmental movement.

#### **Part I:**

Watch Biomagnification and the Trouble with Toxins by the Amoeba Sisters

<https://www.youtube.com/watch?v=TZk6vcmLcKw>

Answer the following questions in complete sentences.

1. What was DDT used for in the 1940's?

2. What is biomagnification?

3. Why is it safer to eat smaller fish with shorter life spans (salmon) than it is to eat larger fish with longer lifespans (tuna)? <http://www.today.com/health/it-ok-eat-fish-every-day-t34261>

#### **Part II:**

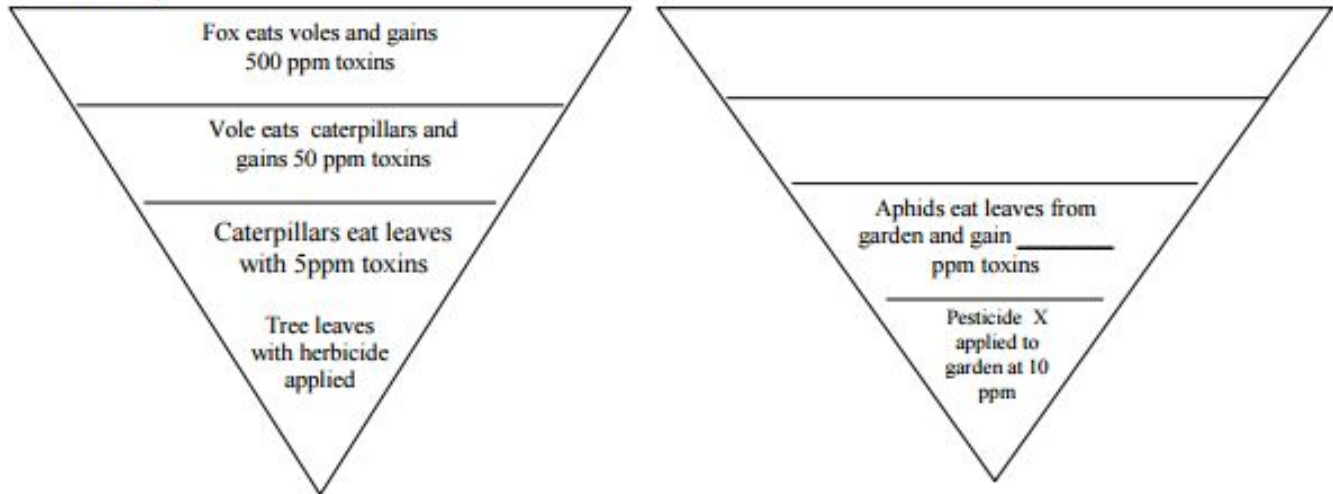
Watch description of Minimata disease <http://www.youtube.com/watch?v=ihFkyPv1jtU&feature=related>

1. What are the symptoms of Minimata Disease?



2. Assuming that each higher level consumer consumes 10 times more toxins than the level before, complete the toxicity pyramid below that shows the bioaccumulation that occurs in the food chain you constructed in question 1; an example has been provided for you.

Example:



3. According to your toxicity pyramid which of the organisms is going to be affected the most by the pesticide? Explain why using data from your pyramid.

4. If this organism dies, what might the secondary effects be on Uncle Bob's garden?

5. Write a brief email to Uncle Bob explaining the dangers of using pesticide X in his garden. Make sure to explain biomagnification to get your point across.