

Activity Instructions

Bioaccumulation

Beads are used as markers for toxin “particles”.

- Choose a life form to use as a model for how toxins accumulate. Place this card on the table by itself. Choose one person that will ADD toxins (by placing them on the card) and one person that will REMOVE toxins according to the scenarios below.
- **Assume that the life form can rid itself of one toxin every 5 seconds.**
- **Scenario one:** Low pollution of the water.
 - **The life form absorbs a toxin every 10 seconds.**
 - Use a timer to add and remove (if present) toxins at the correct rate.
 - Describe what happens:
- **Scenario two:** Intermediate water pollution.
 - **The life form absorbs a toxin every 5 seconds.**
 - Use a timer to add and remove (if present) toxins at the correct rate.
 - Describe what happens:
- **Scenario three:** High water pollution.
 - **The life form absorbs a toxin every 3 seconds.**
 - Use a timer to add and remove (if present) toxins at the correct rate.
 - Describe what happens:

The Food Web

- Lay out all the life form cards.
- Use skewers to show which animals consume which other animals or plants.
- HINT: Place plants on one end of the table and the top predators on the other end of the table. Arrange the other life forms between them. If necessary, rearrange cards as you go to make the connections easier to show.

Biomagnification / Bioamplification

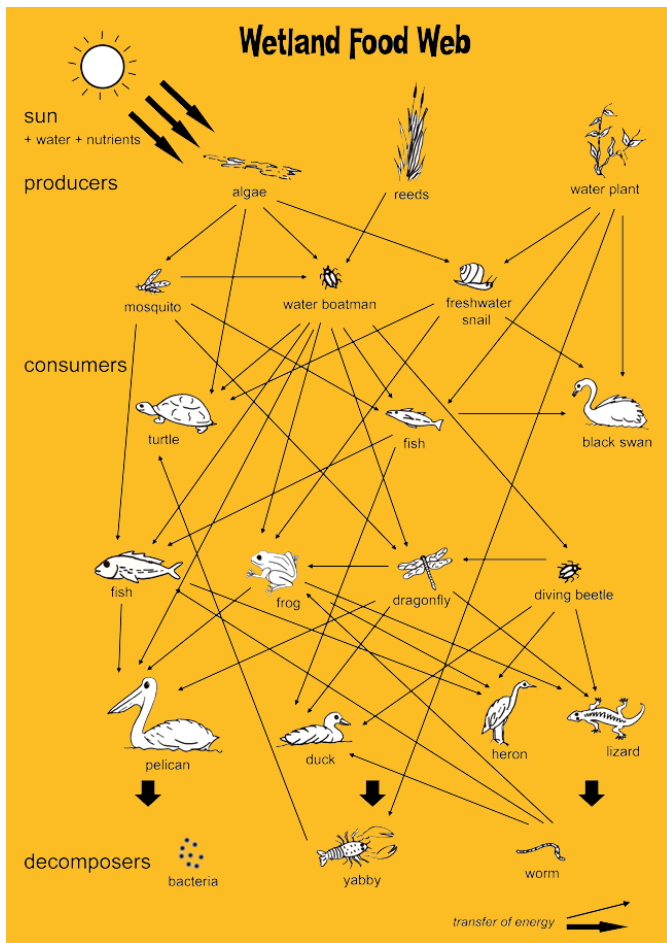
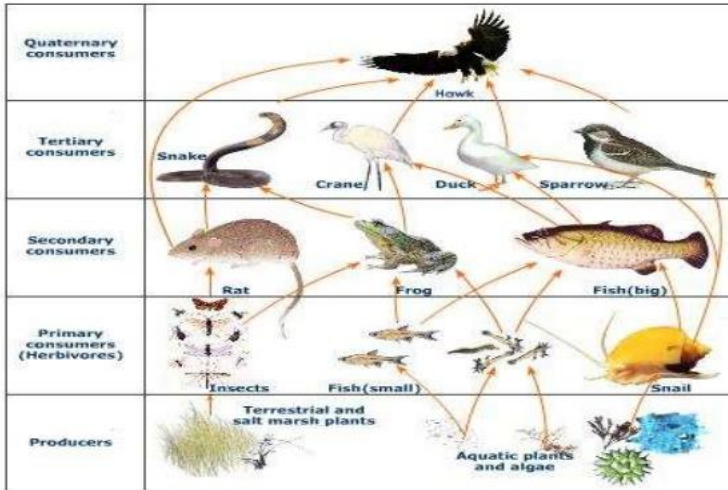
- Place one marker on each of the lowest level life forms.
- Now look at each life form in the food web, moving up from the bottom to the top:
 - Count how many markers are on the lifeform being consumed. Use this number to add toxin markers to the consumer. They will receive toxin markers from multiple lifeforms in the lower trophic level.
 - Keep moving through the web until you reach the end of each branch.
 - Describe what happens:

Further investigation:

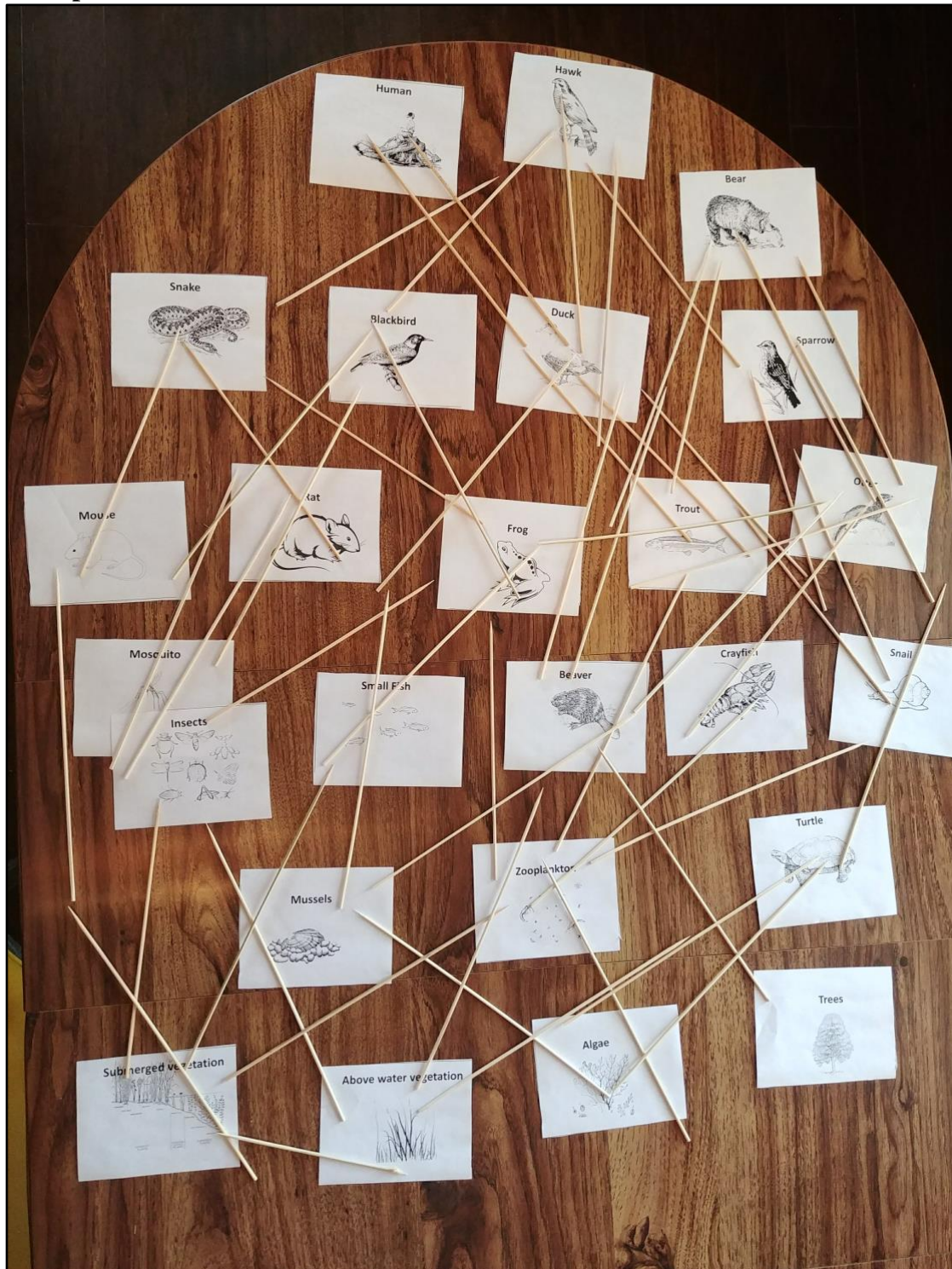
- In reality, each **higher level consumer eats MANY lower level producers**. In this scenario, add two or three toxin markers to the consumer for every one marker that it gets from a lower level producer.
- What differences do you notice compared to the initial model? Describe what happens:

Examples of Food Webs:

FOOD WEB IN TERRESTRIAL AND AQUATIC ECOSYSTEM

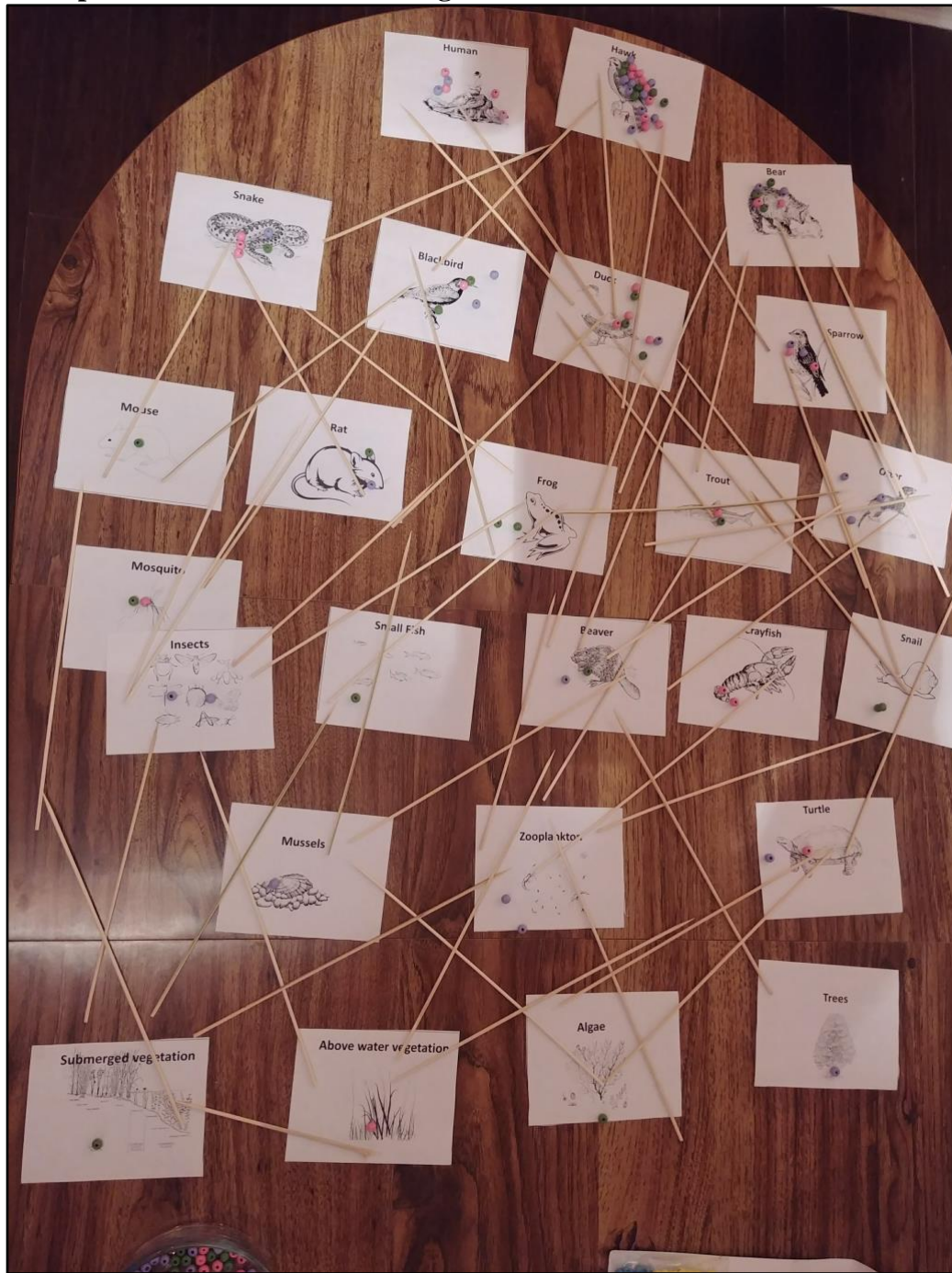


Example of a foodweb:



This is an example of a student food web. Note that a few animals for which cards are included are not used in this example.

Example of a food web with biomagnification markers



Here you can see a simple example where each life form gets one marker for every marker in a life form below it. At the bottom of the food web, the biomagnification effect is not obvious but once you get to the top, predators (e.g. hawk) are greatly affected! ... Keep in mind that each **higher level consumer eats MANY lower level producers** so in reality the biomagnification is many times greater.