**Bioaccumulation Game “Trace the Toxin”**

**Materials**

• Freshwater/Saltwater Life Cards

• Poker chips (at least 3 different colors; 1 color 30% of total number)

• Small plastic, paper, cloth bags or containers

• Large area (clear of desks)

• Chalk or dry erase board and markers

1. Designate an area for your saltwater “ecosystem”, which will be everyone’s

“home” for the game. Determine the boundaries of your “ecosystem home” in the

classroom.

1. Representing different phytoplankton, disperse the colored poker chips around within the

boundaries of the “ecosystem home”.

1. Hand out a Life Card to each student. Tell students to quietly read their Life Card to

themselves. Tell students that each Life Card is different. Class size may vary, but use

over 55% or more of zooplankton to other animals.

* For a marine environment: zooplankton, small fish, seal, & shark. Assign roles:

15 zooplankton, 9 fish, 3 seals, 1 shark.

**Round 1:**

Ask students which organism(s) out of the 4 eats the phytoplankton (zooplankton –

primary consumers).

1. Hand out a food bag or cup to each of the ‘zooplanktons’. Tell students that the

zooplankton have 10-15 seconds to graze on or eat the phytoplankton. In order to

pick up the chips, students must bend down, pick up one chip, stand up, and then

place it into their cup. Tell the students they are not allowed to take handfuls of

chips at a time. Emphasize that students follow their Life Card instructions.

2. At the end of pre-determined time due to class dynamics (ex:10-15 seconds) tell

the zooplankton to stop picking up chips.

**Round 2:**

Ask students who is in the next level in our food chain (small fish). Now involve the fish

(secondary consumers).

3. Tell the ‘zooplankton’ to continue feeding on the phytoplankton, but to be aware

of predators. If they are tagged, they must hand their food bag or cup to the

student who tagged them.

4. Tell the ‘small fish’ they have 10 seconds to “eat” (by tagging on elbow) the

zooplankton. Remind students to follow their Life Card instructions. If need be,

ask each student how much they can eat.

5. After 10 seconds, tell all the zooplankton, tagged or not, to return to their seats

along with their bag/cup.

**Round 3:**

Ask students who is the next level in our food chain (seals). Now involve the

gamefish or seals (tertiary consumers).

6. Tell the ‘fish’ to symbolize a predator “eating” their prey by tagging their prey’s

elbow. Again, if tagged, the student hands their food bag/cup to the student who

tagged them.

7. Tell the ‘seals’ they have 10 seconds to eat the small fish.

Emphasize that the seals follow their Life Card instructions. If need be,

ask each student how much they can eat.

8. After 10 seconds, tell all the small fish, tagged or not, to return to their seats along

with their bag/cup.

**Round 4:**

Ask students who is the next level in our food chain {shark}. Now introduce the

shark or osprey (top of food chain).

9. Tell students to symbolize a predator “eating” their prey by tagging their prey’s

elbow. Again, if tagged, the student hands their food bag/cup to the student who

tagged them.

10. Tell students they have 10 seconds to eat the seals. Emphasize that they

must follow their Life Card instructions. If need be, ask the student how much

they can eat.

11. After 10 seconds, tell all the remaining players, tagged or not, to return to their

seats.

**Wrap-up:**

1. Summarize the game, vocabulary, and anything else you wish to reinforce learning.
2. Tell students that some of the phytoplankton are toxic, specifically the Red chips! Note:

if there are multiple classes, change the color of the toxic chip.

1. Have students go through their food bag and sort food. If a student does not have

a bag, tell them to work with a partner.

1. Have students count the total number of poker chips and the total of red poker

chips they collected.

1. Using the board, create 3 columns: organism, total # poker chips, and total # of red poker

chips. (Option: This can be done after each Round or at the end)

- Ask each group (zooplankton, fish, etc.) to tell you their answers; write on board.

- Average amount of red chips per feeding level.

**Reflection:**

Ask students to answer the following questions:

1. Identify one or more carnivores from the ecosystem brainstorm or bioaccumulation game.
2. Identify one or more herbivores from the ecosystem brainstorm or bioaccumulation game.
3. Which group contains the greatest amount of energy in a food chain?
4. Describe how bioaccumulation works. Use examples from the bioaccumulation game.
5. Describe one action that can be taken to reduce bioaccumulation from occurring locally.