

Lesson 2 - Student Activities 2:

Food Chain Game

Adaptation of the Ohio Sea Grant Education Program's activity "How do toxins move through the food chain" and Project Wild's activity "Deadly Links".

Materials needed:

For a class of 30 students, about 200 pieces of small objects like poker chips or milk bottle caps. These objects represent plankton (both phytoplankton and zooplankton). 1/3 of the markers should be a different colour or have a distinct marking. Why this is done will become apparent when the game is played in Lesson 4.

- 1 plastic bag (recycled) for each student that is a herring. The bags represent stomachs.
- Armbands, pinnies or face-paint to mark what organism the student is.

Round I – Resident killer whale food chain:

Assign the following roles to students. Numbers in brackets show number of students. There should be about 3 times as many salmon as killer whales and about 3 times as many herring as salmon:

- Herring (21)
- Salmon (7 students)
- Resident killer whales (2 students)

Students should be marked so that it can be recognized who the herring, salmon and resident killer whales are.

The plankton markers are spread out through the playing area. The playing area is defined and it is explained to students that the bags represent stomachs. Explain that the game is going to mimic the resident killer whale food chain. Herring are only allowed to feed on plankton by gathering the markers. Salmon are only allowed to feed on (tag) herring and resident killer whales are only allowed to feed on (tag) salmon. When you get tagged, you hand over your bag(s) to your successful predator and go to the sidelines.

The herring are sent into the playing field to collect plankton into their stomachs. When about 1/3 of the plankton are still left, send in the salmon. The salmon should attempt to tag the herring. The herring are still trying to collect plankton markers.

Once the herring have had some time to feed, send in the resident killer whales. The resident killer whales attempt to tag the salmon. The salmon are still trying to tag the herring and the herring are still trying to collect plankton markers!

Stop the game when there are still some surviving salmon.

Have students collect in a circle. Count and record how many of each kind of surviving organism there are and the amount of food that each surviving organism has. Total the amount of food for each level in the food chain. Discuss with students what they learned from the game.

| Organism | Number Surviving | Amount of food energy per animal (number of plankton markers) | Total amount of food energy for the species |
|------------------------|------------------|---|---|
| Resident killer whales | 2 | | |
| Salmon | | Salmon #1 Salmon #2 Etc. | |
| Herring | | Herring #1 Herring #2 Herring #3 Etc. | |

Discussion points:

- Are the results what you would expect in nature?
- Why are there usually less organisms at every level of the food chain?

Round 2 – Transient killer whale food chain

Play starting with the same number of pieces representing plankton. You will need another colour pinny or armband.

Play as above but assign the following roles to students:

- Herring (21 students)
- Salmon (6 students)
- Seals (2 students)
- Transient killer whale (1 student)

Seals may only eat salmon and the transient killer whale may only eat seals.

Stop the game when there is still at least one surviving seal.

Count and record how many of each kind of surviving organism there are and the amount of food that each surviving organism has. Total the amount of food for each level in the food chain.

| Organism | Number Surviving | Amount of food energy per animal (number of plankton markers) | Total amount of food energy for the species |
|------------------------|------------------|---|---|
| Transient killer whale | 1 | | |
| Seals | | Seal #1 Etc. | |
| Salmon | | Salmon #1 Salmon #2 Etc. | |
| Herring | | Herring #1 Herring #2 Herring #3 Etc. | |

Discussion points:

Are the results what you would expect in nature? How is the situation different for the transient killer whale than it was for the resident killer whale? **The transient is feeding further up the food chain so there is less energy available than there was to support the resident killer whales. The seals are at the same level as the resident killer whales so have the same amount of energy available to them.**