

Activity Title: Who can Harvest a Walleye?

Learning Objectives

The Great Lakes are an example of a natural community. In this community the small organisms (living things) outnumber the large organisms. The smaller organisms may be eaten by the larger ones. If we count all the organisms of one kind, then count all the things they eat and all the things that eat them, we can draw a pyramid of numbers that will also show who eats what.

When you have completed this investigation you should be able to:

- Apply the meaning of the following terms as they relate to a biomass pyramid: producer, herbivore, first-order carnivore, second-order carnivore.
- Calculate the relative number of kilograms at each level of the biomass pyramid in a given environment.
- Analyze how different conditions in the environment affect the pyramid.

Ocean Literacy Principles:

#6 – The ocean and humans are inextricably interconnected

Supplies and Materials

- Walleye Game Board (included in original lesson)
also available @ [www.iisgcp.org/catalog/downloads_09/Who Can Harvest a Walleye.pdf](http://www.iisgcp.org/catalog/downloads_09/Who%20Can%20Harvest%20a%20Walleye.pdf)
- Productivity Cards (included in original lesson)
also available @ [www.iisgcp.org/catalog/downloads_09/Who Can Harvest a Walleye.pdf](http://www.iisgcp.org/catalog/downloads_09/Who%20Can%20Harvest%20a%20Walleye.pdf)
- Biomass Record (included in original lesson)
also available @ [www.iisgcp.org/catalog/downloads_09/Who Can Harvest a Walleye.pdf](http://www.iisgcp.org/catalog/downloads_09/Who%20Can%20Harvest%20a%20Walleye.pdf)
- Markers (buttons)
- Spinner
- Pencil or pen

Background

In the "Walleye Game" there are four levels to the pyramid. The largest level is that of algae, the tiny water plants that produce food by photosynthesis. The other levels are all consumers that cannot make their own food. Gizzard shad are small fish that eat algae. Because they are plant eaters, scientists call them herbivores. The walleye is a larger fish. There are fewer walleyes than gizzard shad, so the walleye level is smaller. Walleyes eat herbivores, so scientists say that walleyes are first-order carnivores. The organism that eats the first-order carnivore (a person, in this game) is called a

second-order carnivore.

Duration

45 minutes

Audience

Grades 3-6

Procedure

The object of this game is to end at the block labeled "Harvest" with at least one kilogram of fish. You will keep track of kilograms (kg) of organisms on the "Biomass Record." The game is best played by 2-4 individuals.

1. Before playing the game, read through the game board and Productivity Cards to pick out any words that are new to you. Look up the words in the Glossary.
2. Begin at START with 1,000 kg of algae. Record this amount in the "Producers" column of the Biomass record. Spin the spinner to see who moves first. The player with the highest number will move first. Play then goes around the board to the left.
3. Move through each level of the pyramid by moving your marker the number of spaces shown on the spinner. Change your number of kilograms as the board directs. Record the new number of kg on your Biomass Record each time the mass changes.
4. Some sections of the board require you to divide the mass of the organisms by some number. Drop any fractions that you get in your answers.
5. At the end of each level, it is assumed that all organisms are captured by organisms of the next level. You must change columns on the Biomass Record and divide by 10 whenever you pass the algae or fish pictures, even if you don't land on them. (Scientists know that on the average, only 10% of the energy available at one level of a food chain is passed on to the next level.)
6. If at any time you have less than 1 kg left, you must return to block 1 and begin again.
7. The winner of the game is the first player to land at the triangle labeled "Harvest" with at least 1 kg of walleye. You must spin the exact number to land on "Harvest."
8. At the end of the game compare results on your Biomass Record with those of the other players. Compare the kg of biomass that you had at the beginning of each level of the pyramid.
9. List on your worksheet some of the things that happened to your organisms and how they affected your populations as you progressed through the game.

Assessment

Review Questions:

1. Give an example of the kinds of organisms represented in a food pyramid. What kinds of organisms are on the bottom? Why?
2. Which levels of a pyramid have the least energy available? Why?

Additional Resources

Almost all biology and ecology texts will have some reference to food chains, pyramids, and webs. The

texts below may be useful.

Miller, G. Tyler, Jr., *Living in the Environment: principles, connections, and solutions*. 8th Ed.
Wadsworth Pub. Co., Belmont, CA, 1994. 701 p., ill.

Ohio Department of Natural Resources, Division of Wildlife, Publication 185, "Gizzard Shad in Ohio,"
Life History Notes.

Ohio Department of Natural Resources, Division of Wildlife, Publication

The full lesson for "Who can Harvest a Walleye" can be found at:

[http://www.iisgcp.org/catalog/downloads_09/Who Can Harvest a Walleye.pdf](http://www.iisgcp.org/catalog/downloads_09/Who%20Can%20Harvest%20a%20Walleye.pdf)

Source:

OEAGLS EP-11, *To Harvest a Walleye*, Activity A, by Susan Leach, Gabriele Reil and Rosanne W. Fortner.

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