

Lesson Plan

Part 1: Go Fish! *Exploring The Tragedy of the Commons*

Lesson Submitted by: Claire Barnett

Time: 1 class period

Aim: This is a hands-on lesson adapted from one written by Jeremy Szerlip (Scarsdale High School, Scarsdale, NY). The purpose of the activity is to introduce the concept of “The Tragedy of the Commons.” It is presented in guided inquiry fashion so that students are able to come up with a solution to the problem themselves: the only way to harvest a population for human use indefinitely is by means of a Sustainable Harvest.

Background: The Tragedy of the Commons is an environmental concept that dates back to a 1968 paper written by Garrett Hardin. The Commons dates back even further, the term often used in Colonial times to denote certain lands held “in common” by everyone in a village upon which they could graze their livestock. Since the land belonged to no one and everyone, an individual could benefit in the short-term by putting too many animals on the land, thus resulting in overgrazing and deterioration of the resource. Unfortunately, human nature coupled with the long-held belief that the earth’s resources are virtually inexhaustible has led to a world-wide deterioration of “common” resources, such as oceans, the air, wildlife populations, etc. Exacerbating this is the fact that humans frequently look to short-term benefits without a view of the long-term consequences.

Teacher Notes:

1. Make sure you double-check for food allergies before undertaking this lesson.
2. Reproduction: Double the number of fish remaining in the lake.
3. Make sure the kids do not talk or communicate while fishing.
4. Time the rounds, telling them when to start and stop fishing.
5. Follow-up: class discussion
6. Evaluation: Have them write a summary of what they have learned.
7. Post-lesson activities: Introduce terms;
 - a. Tragedy of the Commons
 - b. Sustainable Harvest
 - c. Look at stories of Fishery Collapses

National Science Education Standards:

Content Standard A (Science as Inquiry): all students should develop --

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Content Standard C (Life Science): all students should develop understanding of --

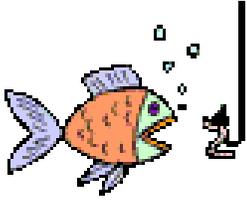
- Structure and function in living systems
- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptations of organisms

Content Standard F (Science in Personal and Social Perspectives): all students should develop understanding of --

- Personal health (bioaccumulation)
- Populations, resources, and environments
- Science and technology in society (fisheries, fishing technology)

Content Standard G (History and Nature of Science): all students should develop understanding of --

- Science as a human endeavor
- Nature of science
- History of science



Go Fish!

Introduction: In colonial days, there was usually an area of land set aside in each town called a “commons,” upon which all townspeople could graze their livestock. In Ecology, this concept is employed to understand the use of resources that are shared, or held in “common.” In this activity, you will learn what often happens to such commonly-held resources.

Materials:

- 1 pair of chopsticks for each student
- 16 Goldfish crackers for each group of four
- 1 dish for each group of four (“lake”)

Procedure:

1. Each one of you represents the head of a hungry family. In order for your family to survive, you must catch enough fish for them to eat. The only food source is a small local lake which can hold up to 16 fish.
2. Once a year you will get a chance to fish and each time you fish you may take 0, 1, 2, 3, or 4 fish from the lake. It is your choice how many fish you take!

One fish: Your family starves.

Two fish: Your family survives.

More than 2 fish: You can sell them for a profit.

3. You will fish for 5 years. After each “year” of fishing, fill in the Data Table for Game #1.
4. The fish in your lake will reproduce once a year. Keep the fish that you “catch” in front of you. (You will be able to eat them later!)
4. At the end of each “year,” your teacher will add more fish to the lake to simulate reproduction.

5. If any family has starved then you cannot fish the next year!
6. **You are not allowed to talk or communicate while fishing!**
7. Do not begin until the teacher says to start fishing.
8. After the first game, answer discussion questions 1 -- 6. You may discuss the questions with your group, but you should each write your answer in your own words. Remember to always answer your questions in complete sentences so that a reader would understand your answers even if he or she did not know the questions!!
9. After you have answered discussion questions 1 through 6, begin Game #2. Fill in the Data Table after each round. Remember, you MAY NOT communicate with each other while fishing!
10. When you have completed Game 2, answer the rest of the discussion questions.

Go Fish! Discussion Questions

1. Did anyone in your group take too many fish? What was the consequence?
2. How did it make you feel if anyone did take too many fish?
3. Did everyone in your group try to take as many as possible? Why or Why not?
4. Does our society reward those with the "most"?
5. Did anyone sacrifice the number of fish they caught for the good of the community? Why or why not?
6. Does society ever reward that type of person?
7. In Game 2, did you change your strategy? If so, what did you do differently and why?
8. Is it possible to maximize the number of fish caught per person **AND** the number of fish remaining in the lake? Explain.
9. Think of a **local "commons"** that you are familiar with. (e.g. parking lots, public bathrooms, parks, the school cafeteria, the hallway, etc.) Do similar situations arise? Explain.
10. How might those problems be solved? Be specific!
11. What are some **natural resources** that are **common** resources?
12. What are the **global commons**? Are these being used wisely? Explain.
13. What can people do to use these resources more wisely?



GO FISH!
DATA TABLE
Game #1

PERIOD _____

NAMES OF FISHERMEN/WOMEN: _____

	Number of fish in the lake [after reproduction]	Number of fish caught per person	Number of fish caught per year [by everyone]
YEAR ONE			
YEAR TWO			
YEAR THREE			
YEAR FOUR			
YEAR FIVE			
TOTAL			

GO FISH!
DATA TABLE
Game #2

PERIOD: _____

NAME OF FISHERMEN/WOMEN: _____

	Number of fish in the lake [after reproduction]	Number of fish caught per person	Number of fish caught per year [by everyone]
YEAR ONE			
YEAR TWO			
YEAR THREE			
YEAR FOUR			
YEAR FIVE			
TOTAL			