

## Tragedy of the Commons: Fish stock as an example

Goal: to use an interactive game to explain 'Tragedy of the Commons'

Time: ~ 45 minutes

Group size: up to 40 students

Materials: tape and candy, peanuts, pennies, paper, or straws

Procedure:

1. Split students into groups of 4 or 5.
2. Each group selects an area that will be their fishing grounds.
3. Start each group with 50 pieces of candy, pennies or peanuts (or whatever you have in your classroom) to spread throughout their fishing grounds. You can tape off an area to represent fishing grounds or use a table surface, etc.
4. Explain that they are fisherfolk and that the candy, pennies or peanuts represent fish.
5. To reinforce the incentive to fish, you can set rewards or goals for catching more fish to encourage/simulate more competition and the monetary gains that commercial fisherman receive for their efforts.

For example:

- 10 fish will earn you a sticker
- 20 fish will earn you a bookmark
- 30 fish will earn you a book

6. Students have 15 seconds to fish. They may only take one piece at a time and may use only one hand (different techniques can be used to represent different fishing methods/gear.)
7. After 15 seconds, the fisherfolk stop fishing. Count the number of fish left and add that many more fish to the fishing area (so the population of fish that were left have now doubled). If the fish are gone, discuss what has happened: the fisherfolk have completely depleted the fish stock! If the fish are gone in one round, you might have them start over.
8. Repeat this 3 to 5 more times.
9. Stop and talk about what happened. Do the students change their behavior through the course of the game? Do they work together or communicate to prevent a tragedy of the commons or not? What could people do to prevent a tragedy (no fish! or so few that they can no longer support fisherfolk and are probably no longer a functioning part of their ecosystem) from happening?
10. You might now talk about one or more Marine Protected Areas as one possible solution and/or play the MPA Simulation game.

## Teacher Background

In 1968, Garrett Hardin wrote a paper that was published in *Science* (vol. 162, p 1243, 13 Dec 1968) called *The Tragedy of the Commons*. The article appears online here in its entirety: [www.garretthardinsociety.org/articles/art\\_tragedy\\_of\\_the\\_commons.html](http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html)

"The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision making herdsman is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another.... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit - in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Some would say that this is a platitude. Would that it were! In a sense, it was learned thousands of years ago, but natural selection favors the forces of psychological denial (8). The individual benefits as an individual from his ability to deny the truth even though society as a whole, of which he is a part, suffers. Education can counteract the natural tendency to do the wrong thing, but the inexorable succession of generations requires that the basis for this knowledge be constantly refreshed."