**The Tragedy of the Commons**Adapted by Carolyn Klein

**Objective:** To demonstrate the possible consequences to shared resources and to develop strategies to protect these resources

**Materials:**
Straws (one per student), one bag of pinto beans, one bag of small lima beans, about a dozen plastic spoons, containers such as the boxes mushrooms are sold in or large yogurt containers. You will also need a timer/watch and a whistle/horn/signal.
Note: To reduce waste, this activity could be done with chop sticks and beads which have holes big enough to insert the tip of the chop stick.

**Grade level:** 6-12

**Background information:**

In the 1960’s, Garrett Hardin coined the phrase “Tragedy of the Commons” to describe common environmental damage. His title refers to the common area of a traditional New England town. These communities built their church, storefronts and public buildings around a grassy field. Sheep were grazed on the field in the relative safety of the town. As long as each family only put a few sheep on the commons, there was enough grass for all. If one family added a few extra sheep, that might be ok, but other families tended to notice and would also put out additional sheep. Soon, the commons would be over-grazed and every family suffered.

Hardin recognized that the problem arose because the commons was a resource shared by the community. No one personally owned the commons, so no one felt personally responsible for its overall success. Although no individual family’s choices were the downfall of the commons, the accumulated behaviors ultimately harmed the entire community.

The Tragedy of the Commons is exemplified by the issue of overfishing in our oceans. No individual (or country) owns the entire fish resource. Although no individual decisions about how many fish to take would be enough to deplete global fish stocks, the accumulated choices are causing global problems. Climate change is another example of the Tragedy of the Commons playing out in our atmosphere which no one owns but upon which we all depend. Open land, like our prairies, may not be commonly owned, but the loss of each small piece of the prairie to development is adding up to cause massive loss of biodiversity and increased flooding downstream.

This video summarizes the Tragedy in two minutes: <https://www.bing.com/videos/search?q=tragedy+of+the+commons+video&&view=detail&mid=05876C1A21353D8EC2CD05876C1A21353D8EC2CD&rvsmid=54646D3E45AE0FC1D6DF54646D3E45AE0FC1D6DF&FORM=VDQVAP>

**Preparation:**
1. This activity is played in groups of four. Each team will need one “lake” (mushroom box) with 14 small beans and 6 large beans. They will also need one straw per person and a data table. (If substituting beads and chop sticks, this would become one stick per person, 14 beads of one color and 6 beads of another. In this case, the students would “fish” by using their non-dominant hand to spear and pick up a bead from the “lake”.)

2. Set aside the remaining pinto beans, lima beans and spoons for use during the game.

3. Student sets of the fishing directions can be printed out and put into plastic sleeves. Data tables can be put on the back side of the directions in the sleeve. This allows students to use dry erase markers during the game to track their progress, and the data tables can be reused.

4. It is best to play the game before explaining the Tragedy of the Commons to the students. It will happen naturally, then the instructor can explain the concept to the class. Often, one or two teams will realize early what is happening and will plan a strategy to avoid the tragedy which maximizes profits and success. The discovery is the real object of the game.

**Activity:**

1. Explain the purpose of the activity to the students: To explore how resources are used when they are available to multiple parties.
2. Tell the student that they will be fishing today. Tell them the goal will be to maximize their team’s profits. Walk them through the directions.
3. Play enough rounds to make sure that at least one team has completely wiped out their fish. Ask the students to total their group profits and share those numbers with the class. Which teams made the most/least money? What behaviors made the difference?
4. Discuss with the class what has happened. Explain the Tragedy of the Commons.
5. Challenge the students to devise a strategy to maximize profit while simultaneously avoiding the Tragedy of the Commons.
6. Reset the “lakes” and let the students try again using their new strategies. This often leads to conversations about how to deal with individuals who “cheat” or don’t follow the strategy. This is an opportunity to talk about resource laws.
7. Conclusion: Remind the students that the Tragedy of the Commons happens when individual harm accumulates to damage a commonly-shared resource. Ask the students to imagine what the opposite of the Tragedy would be. How would our resources be different if everyone created individual positive contributions? Ask the students to generate examples of possible positive contributions.

**Tragedy of the Commons**

**Purpose:** To explore how resources are used when they are available to multiple parties.

**Procedure:**

1. Put the “lake” in the middle of your four person team so everyone can reach it.
2. The carrying capacity of the lake is 20 “fish”: 6 big fish and 14 little fish.
3. You must fish by sucking up the “fish” from the “lake” with straws.
4. Only one person can fish at a time. As soon as the first person catches a fish, the person to their left gets to fish. You should rotate who fishes first every year so that everyone has a chance to go first.
5. Each “fishing season” lasts one minute and represents one generation of fish.
6. It is your choice of how many fish you take, however, you must catch at least one fish to stay alive.
7. The fish in your lake will reproduce at the end of each fishing season. Each remaining fish is able to spontaneously reproduce and make one new fish (4 fish become 8, etc to a maximum of 20).
8. Each big fish is worth $10. Each small fish is worth $5.
9. You can purchase one upgrade per round if you want, but it is not required.
 First upgrade ($10): hold the straw with one hand
 Second upgrade ($10): hold the straw with both hands
 Third upgrade ($10): use a plastic spoon
10. Keep the fish that you catch in front of you.
11. When your group runs out of fish, the game is over for you.



**Fish Data Table:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year # | # fish beginning of year | Name | Name | Name | Name | Total fish left at end of year |
| 1 | 6 Big + 14 small |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| Total fish |  |  |  |  |  |  |
| Total $Big = $10 Small = $5 |  |  |  |  |  |  |

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| 4 |  |  |  |  |  |  |
| Total fish |  |  |  |  |  |  |
| Total $Big = $10 Small = $5 |  |  |  |  |  |  |

Fish Data Table: Round 1 – Silent fishing! No talking allowed!

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year # | # fish beginning of year |  |  |  |  | Total fish left at end of year |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| Total | XXXXXXXXX |  |  |  |  | XXXXXXXX |

Group totals:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name |  |  |  |  |
| Total fish harvest |  |  |  |  |
| Total income |  |  |  |  |

Fish Data Table: Round 2: Open fishing – Free exchange of information encouraged!

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year # | # fish beginning of year |  |  |  |  | Total fish left at end of year |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| Total | XXXXXXXXX |  |  |  |  | XXXXXXXX |

Group totals:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name |  |  |  |  |
| Total fish harvest |  |  |  |  |
| Total income |  |  |  |  |

Reflection questions:

1. Compare the first and second rounds: how did the group total incomes compare?
2. Was either round sustainable? Explain.
3. A commonly shared resource can be used by everyone – no one owns it. If the lake had only been fished by **one person** who owned it, would you expect the fishing to be more or less sustainable? Explain your answer.
4. The “Tragedy of the Commons” is a situation in which individuals use a commonly shared resource for their own personal gain which usually results in damage to the resource. In the end, individual and group benefit decreases. How is this activity a model of the Tragedy of the Commons?