

Lab Investigation: Overfishing Simulation (Teacher Guide) (Written by Lauren Fieberg, Sage Hill School, Adapted from The Tragedy of The Commons Overfishing Activity author: unknown)

Goal: To understand how public resources such as the ocean can become exploited (overused) causing some species to decline and other potentially to increase affecting the long-term sustainability of these ecosystems and threatening biodiversity. Ultimately, to understand the need for Marine Protected Areas and Citizen Science.

Introduction: Overtime, change in the number and variety of species can cause shifts in ecosystems that can be harmful. Marine Protected Areas (MPAs) are established to ensure that these ecosystems remain healthy by providing a safe haven for species protecting them from overfishing, and other forms of human impact. In this simulation you will mimic fishing companies fighting for fish in a local marine ecosystem that has not been established as an MPA. The more fish you catch the more money you make.

Materials

- ⇒ 2 kinds of snack crackers (start with 20=10 of each type)
 - ⇒ 1 dixie cup per person (represents each companies boat)
 - ⇒ 1 straw per person (represent fishing poles)
 - ⇒ 1 paper plate (represents the coastal ocean ecosystem)
 - ⇒ Piece of paper for recording Procedure
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- ⇒ Pass out the materials to each group (4-5 people max per group)
 - ⇒ Designate a recorder ⇒ 10-15 rounds: 1 min per round (keep time)
 - ⇒ Each round students will attempt to suck as many fish through their straw and carry them to their cup
 - ⇒ Have students record the total # of fish of each type after each round left in the ecosystem and the total # of each that they have caught

Important Notes: Students only need to catch 1 fish per round to sustain their business but there is more money to catch more fish;

⇒ After first round tell students that all fish left in the ocean reproduce one fish (ex. They have 6 fish left in ocean---they add 6 more) this occurs each round

⇒ After 10-15 rounds have students make final tally of how many fish are left in their ocean ecosystem

Guided Discussion Questions (Whole class)

1. How many groups had zero fish left in their ocean? What does this mean for the ecosystem?
2. How many groups only had one type of fish left in the ecosystem? Does this mean the biodiversity of the ecosystem was reduced?
3. How did money play a role in encouraging people to catch more fish?
4. How could the establishment of a Marine Protected Area change the threat to species?
5. How could species monitoring through citizen science help these ecosystems?