

Gone Fishing

Students will model old and new fishing technology and examine the effects that the different methods have on fish populations and biodiversity.

Activity Time: 30 minutes

Materials:

For each team of two

- 1 small paper bowl
- tweezers or chopsticks
- 1 plastic spoon
- 1 bag M&Ms (about 30 candies)
- 1 paper cup

Background:

Not long ago, fishing in the ocean was a slow and tedious task, with relatively few fish being brought in with every voyage. Today, technology has made it possible for fishing vessels to take in thousands of fish in a relatively short amount of time. While this benefits the fishing industry in the short term, it may cause fish populations to quickly decrease to the point where they can not recover. If one species is removed from the ecosystem, the imbalance is felt up and down the food chain with other populations either growing out of control because nothing is eating them or dying out because they have nothing to eat. Entire ecosystems can begin to die out when there is less variety of life (biodiversity) in the area.

In this activity, students will go “fishing” with differing levels of technology and see what effect it has on the fish population in the ecosystem.

Procedure:

1. Divide the students into teams of two and distribute the materials to each team. The teacher will place about 15 M&Ms (fish) in each bowl. Tell students not to eat the M&Ms (although they may get a chance later!).
2. One person will represent the ocean ecosystem and hold the bowl. The other student will represent the fisherman (or woman) that will fish from the ocean and will have the tweezers (or chopsticks) and the empty cup.
3. Students (fishers) have 30 seconds to collect as many “fish” as they can out of the ecosystem and into the cup using the tweezers. Have students record the number fish caught and the number of fish still remaining in the ocean using the data sheet provided.
4. Once the catch is recorded, students can eat their catch (ocean and fisherman can share). The teacher will come around and replace one half the number of fish that are remaining in their ocean ecosystem. For example: if there are 10 fish left in the bowl, the teacher would add 5 additional fish, as the fish would have had some time to recover and mate.

5. Now tell the fishermen that there have been some developments in fishing technology. The spoon method has been invented and tweezers are outdated. The fishermen will now have 30 seconds to take as many fish as possible using the spoon. When time is called, have the students record how many fish were caught and how many are still in the ecosystem. Again replace half the number of the fish that are remaining. Students may now share their catch.

NOTE: If there are no fish remaining in the bowl, the students do not get any additional fish because they have depleted all of the population.

6. Continue the exercise once more with the spoon, record data, then have students answer the questions on their data sheet.

Extension:

Proceed with the experiment the same way except that the *only* fish that you are wanting to catch are the brown ones. Once you get a fish of any color on your spoon, however, you must remove that fish.

Ask the students the following questions:

- * How easy is it to just pick out just one type of fish?
- * What if you couldn't see them at all?
- * Would you be more likely to pull up a fish or another animal that you couldn't use?
- * What do you think happens to those unwanted fish?
- * How might this affect the biodiversity of the area?

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Data Sheet

Team Members: _____

Number of fish originally in ocean _____

	1st trial (old method)	2nd trial (new method)	3rd trial (new method)
number of fish caught			
number of fish remaining			

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Questions

1. What happened as the fishing technology improved?
2. Why didn't the fish population go back to the original number after every turn?
3. What problems do you think this new method of fishing might cause the food chain in the area?
4. How would the new technology affect the ecosystem as a whole?
5. What do you think happened to the commercial fishermen's profits immediately after they started using the new technology?
6. What do you think will happen to the commercial fishermen's profits in the following years? Explain.
7. How do you think this problem could have been prevented?
8. What can a regular consumer do to help with the problem of overfishing ?

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Student Information Sheet

In the past sixty years, the fishing industry had changed dramatically. New technologies that enable fishermen to significantly increase their catch have been introduced to the fishing community. With these new methods and new nets, fishermen are taking millions more fish per year from the oceans.

Listed below are some of the fishing methods that are being used in the oceans today.

Gill Nets - Vertical walls of netting designed to let fish of a certain size swim part way through, only to get stuck in the netting by their gills. Thousands of unwanted fish get caught and die in gill nets every day.

Purse-Sein Nets - Nets that encircle entire schools of fish, then close at the bottom like a pouch to prevent fish from escaping. Hundreds of thousands of fish are caught at one time. Dolphins are often caught in this type of net and drown when they are unable to come up for air. In the 1990's, consumers became aware of this method of fishing and boycotted all tuna fish that was caught in this way. Most United States tuna companies stopped using purse-sein nets because of this, and the boycott ended successfully.

Trawl Nets - Funnel shaped nets that are dragged behind boats. These nets act as a scoop for any fish, shrimp or other marine animal. Dead, unwanted fish are thrown back into the water after the net is brought up to the boat.

Angling/Sports Fishing - Fish are caught one at a time using poles and bait or lures. If large groups of anglers fish in a small area over a long period of time, the fish populations can significantly decline. In most cases, however, sports fishing has a much smaller impact on an ecosystem than large scale commercial fishing.

Consumers that are well informed are the best defense against the problem of overfishing. If consumers choose to eat only fish that were caught by responsible fishing methods, the fishing industry will be forced to change their practices. Eating only hatchery-raised fish is another thing that consumers can do to ensure that the ocean fish populations remain stable.