



Activity 5: Sustainable Fishing



Topic: Youth will play the role of fishermen in a fishing simulation that demonstrates the differences between sustainable and unsustainable fishing methods.

Time: This lesson should take approximately 45-60 minutes to complete.

Learning Outcomes

At the end of this activity, youth should be able to...

- 1 Compare and contrast the differences between fishing sustainably and fishing unsustainably.
- 2 Explore the difficulty in managing sustainable fishing.

Background Information for Facilitator

According to the Marine Stewardship Council, sustainable fishing has three branches: (1) sustainable fish stock, (2) minimizing environmental impact, and (3) effective fishery management. Keeping and maintaining a sustainable fish stock ensures that enough fish are left in the ocean after harvesting to reproduce and maintain population sizes for future generations (and future fishing). Minimizing environmental impacts helps support the quality of the fished ecosystems as a whole. This may include using biodegradable materials or not overfishing a population. Effective fishery management includes the laws and policies that need to be

followed as the environmental circumstances around fishing change and update. **Why is sustainable fishing important?** Sustainability, in general, implies that the resources available now will also be available in the future, for future generations. For example, the Wabanaki people have lived in the area we call Maine for thousands (at least 9,000) of years. They have depended on the resources that this area provides, which they are able to hunt, fish, and gather off of. Due to the relationship they have with their resources, they are able to live off of them, generation after generation. The Wabanaki people practice what is called relational living, which means they see and value fish, water, animals, and plants as loved ones or family, doing everything in their power not to hurt them. When they need to take from one of these resources, they ask for permission, and only take a living thing when it is willing to give its life. For example, when a fish is offering its life and is caught, tobacco is offered in gratitude and to provide thanks. In order for the fish to return, they have to be respectful, correct poor behavior, and apologize when needed, just like we do when we hurt the feelings of friends or family. This is one example of sustainability.

Overfishing is a major factor of unsustainable fishing. It is when too many fish are caught that the population cannot reproduce enough to maintain a healthy size. Overfishing can deplete whole populations and species, which can have devastating results: lost jobs and low supply. Other unsustainable fishing practices are illegal fishing and destructive fishing. Illegal fishing includes the illegal, unreported, and unregulated fishing that happens when fishermen and boats fish outside the law (catching more fish than allowed, fishing out of the regulated season, etc.) or boundaries. Examples of destructive fishing are when fishermen use cyanide to stun fish before catching or using explosives to kill fish so they float to the surface for an easier catch. All of these unsustainable fishing practices not only do harm to the fish populations but also damage habitat, ecosystems, and other marine life.

Note for Facilitator: *The first activity in this meeting asks you and the youth to utilize a Venn diagram. The purpose of the diagram is for youth to illustrate the relationship between two concepts. It looks like two large circles, overlapping in the middle. The overlapping section in the middle shows commonalities, whereas the sections that do not overlap do not share traits.*

Materials

- Pony beads (10 per youth)
- Whiteboard
- Dry erase marker
- Spoons
- Aluminum bowls
- Data collection sheet

Vocabulary

- **Sustainability** = using resources in ways that meet the needs of the present but do not deplete the amount for future generations
- **Unsustainability** = using fishing and harvest methods that lead to declining fish populations, harm marine life, and damage ecosystems.

- **Sustainable fishing** = fish are harvested (caught and sold) at a rate that does not decline the populations for future harvesting due to fishing practices.
- **Overfishing** = When too many fish are caught that they cannot breed enough to maintain a healthy population size

Methods

Engage

- 1 Have youth take a moment (a minute or so) and think about what the word ‘sustainability’ means to them.
 - Then, pair youth up and ask them to share their ideas with each other.
 - Come back together as a group and ask for volunteers to communicate the ideas shared within their pairs to the whole group.
- 2 Share with youth the perspective of the Wabanaki people described in the ‘background information’ above.
 - “How does this make you feel about your perspectives of sustainability?”
 - “Does this challenge you to think any differently?”
- 3 Draw a Venn diagram on the board or use poster paper. Label one side ‘sustainable fishing practices’ and the other ‘unsustainable fishing practices.’ Have youth brainstorm what could be some sustainable and unsustainable fishing practices, perhaps taking ideas from their previous conversations. Below is an example diagram with some ideas.
 - Possible prompts to start the discussion: “What allows you to go back to the same spot to fish year after year?” “When you fish, do you ever throw any back? If so, why (size limits, recreation fishing)?” “What types of actions or decisions would make it so you couldn’t fish somewhere year after year?” “What is your relationship with the resource(s)? What about your relationship with others?”

Explore

- 1 Split youth into groups of 3 or 4.
- 2 Give each group a bowl. Explain to the youth that the bowl represents a lake in which they are going fish out of.
 - Put 20 blue beads in each bowl. The beads represent fish.
 - Explain to the youth that they are going to play the role of fishermen, collecting fish from the lake.
 - Give each youth a spoon to fish with. Emphasize that they are only allowed to collect fish with the spoon, no hands!
- 3 There is an option for youth to use a data table as they move through this activity. If you choose to use it, have youth fill in the number of fish at the start for round one (20). See the example below.
- 4 Explain the rules:
 - You have to collect at least two fish to survive and move on to the next round. If you don't collect at least two fish, you sit out a round.
 - For each fish left in the bowl, one fish will be added. This represents reproduction that happens in fish populations. For example: if two fish are left, you will add two for a total of four to start the next round.
 - Explain to the youth that they can all catch fish at the same time, but it only works if everyone is respectful.
 - Give youth 1 minute to fish.
- 5 Play the first round. Walk around to observe youth, including how fast it takes them to complete a round (adjust the time if necessary). It's very likely that the stock will be depleted within the first minute. If this happens, take a moment to discuss what this means for future fishing.
- 6 If you are using the data table, at the end of the first round have youth share how many fish they caught individually. Put those numbers in the second column. Have youth add up all the fish as a collective and put that number in the last column. See the example below.
- 7 Come around and replenish populations (if applicable). If youth are using data tables, have them add the number of fish to start after replenishing to round two.
- 8 Play a couple of rounds.
 - **Optional:** change how many fish get put back in the bowl after each round. This adds a real-life component to the game because the reproductive rates of fish are not always consistent year to year. Factors that can influence reproductive rates are stress, ocean acidification, nutrition status of females, physiological and ecological factors.

Explain

- 1 Over time, fisheries can be overfished, meaning too many fish are caught so there are not enough adults to breed new fish and maintain a healthy population. When fisheries are overfished, the seafood supply is low. People who depend on fish for their main food source or protein are not able to get that nutrition source. People may lose their jobs because there are not enough fish to catch.
- 2 Overfishing can be an outcome of the tragedy of the commons, which is a situation where individuals who have open access to a resource neglect the well-being of society for self-gain. Visit the **Atlantic Cod And The Human 'Tragedy Of The Commons'** (WPUR website) for an article (published December 03, 2014, by David Ropeik) and video that summarizes how the cod decline in Maine as a result of the tragedy of the commons. wbur.org/cognoscenti/2014/12/03/overfishing-georges-bank-david-ropeik

Elaborate

Pick some of the prompts below for youth to discuss:

- 1 “What happened to the fish populations as you completed more rounds?”
 - “Was it sustainable or unsustainable?”
- 2 “How did you make your decision of how many fish to catch?”
- 3 “How is considering others a part of sustainable fishing?”
 - “Think of a body of water that means something to you. How does that relationship to that place change the way you’re thinking? Would it change the way you fish? Would it change how you think about fish?”
 - Option here to have youth close their eyes and think of a body of water. It could be somewhere they go swimming or fish. Maybe somewhere they go year after year, or maybe it’s close to where they live. Encourage them to think about how they feel when they are there and their relationship to that place. Then ask them to consider how their new understanding of sustainability might change how they fish at that location.
- 4 “What else might feed on fish in a lake? How might they be affected by the fish population?”

Evaluate

- 1 Play the game again. This time, have youth come up with a strategy in their groups to try and maintain a healthy population of fish so everyone survives to the next round. In other words, make an agreement or contract.
- 2 Play. If youth are using the data tables, mark this round as the one after collaboration.
- 3 Come back together as a group and discuss the activity.
 - “How did you feel about playing the game with an agreed-upon strategy?”
 - “What did you learn about collaborating through this activity?”

- “Was it hard to get everyone to follow it?”
- “Did you agree on any consequences if you didn’t follow your rules?”
- “What did you learn about your own skill in communicating with others?”
- “How can you use what you learned?”

Extension (there are three different options provided below)

- 1 **Venn diagram connection:** Revisit the Venn diagram you added to at the beginning of the lesson.
 - “After completing the activities, is there anything you want to add to the Venn diagram? Things you want to change?”
 - Depending on how youth connected with the lesson and what they found relevant, you may want to explore/discuss how unsustainable fishing methods affect the environment (whether that is the quality of water or food webs).
- 2 **Play another round:** Illegal, unregulated, and unreported fishing is another contributor to overfishing. The unsustainable practices of some can impact the fishing of everyone.
 - To communicate this concept with youth, have them play a round (perhaps after they have agreed upon a strategy) silently. In this round, no one is going to hold you accountable for your actions. If you choose to respectfully acknowledge the agreement, great! If not, no one is allowed to say anything to you or stop you.
 - “What are the consequences if one member doesn’t abide by the agreed rules?”
 - It’s hard to regulate fisheries acting sustainably because it’s a big area to manage. This provides space for fishermen to be dishonest or not follow regulations, as authorities have to trust fishermen they are practicing sustainable methods of fishing.

- If youth used the data tables, ask them if there are any trends or patterns they notice.
 - “How would having this data be helpful to fishermen? Scientists? Policymakers? Big companies?”
 - “Who should be making these decisions or regulations?”
- 3 **Local connection:** If you have access to technology, you can look up the fish and game laws for catch limits in their area: **Statewide General Fishing Laws for Inland Waters** (Maine Department of Inland Fisheries & Wildlife)
www.maine.gov/ifw/fishing-boating/fishing/laws-rules/statewide-laws.html
- 4 Article and video on overfishing Georges Bank: **Atlantic Cod and The Humans “Tragedy of the Commons”** (WBUR) December 3, 2014, by David Ropeik
www.maine.gov/ifw/fishing-boating/fishing/laws-rules/statewide-laws.html

Additional Resources

Children’s books:

- 1 *Old Enough to Save the Planet*. Be inspired by real-life children taking action against climate change. Written by Loll Kirby and illustrated by Adelina Lirius. This book highlights several youth who took sustainable action or implemented change to better their community and the environment.
- 2 *Plasticus Maritimus: An invasive species*. Written by Ana Pêgo, Bernardo P. Carvalho, and Isabel Minhós Martins. This book personifies plastic and dives into the different types of plastic in our ocean and the consequences of plastic pollution.
- 3 *World Without Fish*. Written by Mark Kurlansky and illustrated by Frank Stockton. This book addresses the issue that at the rate things are going, most of the fish we are familiar with will be gone in 50 years. It touches on the history of fishing, population fluctuations, the socio-economic aspects of the issue, and ideas for change.

NOTE: This activity is an adaptation of the lesson “Fishing for the Future” (The Curriculum Guide ©2002), currently available on the PBS website: **Fishing for the Future (PDF)**.

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