



VA SEA

GOING FISHING IN THE CLASSROOM!

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Grade Level

4th Grade

Subject Area

Life Science / General Science

VA SEA is a collaborative project between the Chesapeake Bay National Estuarine Research Reserve, the Virginia Institute of Marine Science's Marine Advisory Program, and Virginia Sea Grant. The VA SEA project is made possible through funding from the National Estuarine Research Reserve System Science Collaborative, which supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is funded by the National Oceanic and Atmospheric Administration and managed by the University of Michigan Water Center.



Title: Going Fishing in the Classroom

Focus: Simulate overfishing in a classroom setting

Grade Level: 4th grade

VA Science Standards

4.3 – The student will investigate and understand that organisms, including humans, interact with one another and with nonliving components in the ecosystem. Key ideas include:

- 4.3a interrelationships exist in populations, communities, and ecosystems.

Learning Objectives

- ✓ Students will be introduced to basic fisheries management terms and concepts
- ✓ Students will consider the impact of humans on natural resources
- ✓ Students will discuss the importance of being a steward for natural resources
- ✓ Students will think critically about how to manage natural resources

Total length of time required for the lesson

~80 minutes total:

- Advance preparation of materials: 20 minutes
 - Only necessary when preparing cod cutouts (one time)
- Classroom setup: 10 minutes
- Introduction: 10 minutes
- Activity: 20 to 30 minutes
- Discussion: 15 minutes
- Breakdown and clean-up: 5 to 10 minutes.

Key words, vocabulary:

- **Fishery:** (via Merriam-Webster) the occupation, industry, or season of taking fish or other sea animals
- **Fish Stock:** The number of living individuals in a given population
- **Overfishing:** Occurs when fish are removed from a population faster than they can reproduce. The size of the fish stock will only continue to decline until fishing pressure decreases.
- **Sustainable Yield:** The number of individuals that can be taken from a fish stock without reducing the growth of the population
- **Recreational Fishing:** Recreational fishing is commonly done using a rod and reel or other basic technology, and the fish that are caught are not sold or traded.
- **Commercial Fishing:** Commercial fishing is the taking of fish with the intention of selling them. It's usually done using advanced equipment and technology.

Background information

Both of these YouTube videos provide a basic overview of the issue of overfishing. Teacher may consider sharing with the class

Ted Ed Overfishing Explained: <https://youtu.be/WNdR808jMSA>

National Geographic Explanation: <https://youtu.be/KTHTIAHNZxQ>

Fisheries are an important resource to consider when discussing human impact on the environment. Fish are a difficult resource to manage. It is difficult to stop fishermen from going out to sea and catching as many fish as they can, which depletes fish stocks very quickly and can result in their collapse. This emphasizes the importance of effective fisheries management.

The two fish stocks discussed in this lesson are Atlantic cod and Atlantic sea scallops, which have had very different trajectories since the 1980's. Cod were overfished to the point of collapse due to a lack of effective management, and the cod fishery has still failed to recover to what it once was. The activity

that the students are doing today will simulate the collapse of the cod fishery by pushing them to catch as many fish as they can as fast as they can.

The Atlantic sea scallop fishery, on the other hand, has done extremely well since the implementation of a rotational management plan. Some areas of the fishery are closed to fishermen for a period of time, allowing scallops to reproduce and grow to a catchable size, while fishing occurs in other parts of the fishery. This allows the population to at least partially replenish itself without being at risk of being fished. This is just one example of how fisheries management has been effective in preserving the stocks surrounding the United States.

This lesson will introduce students to the different types of fishermen, then allow them to 'go fishing' in the classroom as both a commercial and recreational fisherman. The main activity is designed to encourage students to catch as many fish as they can as fast as they can, just as fishermen do in the real world. After the activity, students will learn more about the finite nature of natural resources and think critically about the impact humans have on them.

Materials & Supplies

- *Going Fishing in the Classroom* PowerPoint presentation
- 100 Atlantic Cod cutouts
 - Print 4 copies
 - Laminate all 4 sheets
 - Cut into columns, exclude 2 of the 12 columns, cut out individual fish
 - Each sheet includes 30 fish, only 100 of the 120 total will be used
- Fish count sheets for each student
- Exit ticket for each student
 - 2 per sheet, sheets are to be cut in half

Activity Overview

Objective: The students will compete to see who can collect the most fish.

Expected outcome: The students will find it increasingly difficult to find fish as they continue fishing.

Similar to a real fish stock, when the activity begins some of these fish will be easy to find and will be collected quickly and easily. The students will then be given a set amount of time to walk around the classroom and pick up as many fish as they can as either commercial or recreational fishermen. Students count their fish, the teacher tallies up the total 'catch', and a leaderboard is established.

As the rounds go on, it will be harder and harder to find the fish. The students will be forced to look harder for fish since there are no more out in the open. The leaderboard should drive students to keep finding as many fish as possible, simulating the competition for common pool resources that exists in the real world. It can be expected that the students will overfish the stock into collapse, and after the fourth round the teacher will explain the importance of taking care of our finite natural resources.

Classroom Set up

- Prior to the lesson beginning, the teacher will scatter and hide the laminated cod cutouts around the classroom. Some of these should be in plain sight, others should be harder to find. The idea is that students will be quick to find fish when they are plentiful, and it will become harder as time goes on.
 - Teacher may consider making notes or taking pictures of fish that are harder to find in order to avoid losing any
- Each student will need a designated area to be their home base for the activity. This does not need to be a large area, but each student needs a place to put the cutouts they 'catch'
- If space and weather permit, the activity could be conducted outdoors

Introduction

Begin the PowerPoint, *Going Fishing in the Classroom*

- While on slide 2, have a brief discussion with the students about sustainability and their understanding of it
- Slides 3-4 will gauge how familiar the students are with fishermen and fishing.
- Ask students:
 - What comes to your mind when you think of a fisherman?
 - How often do you go fishing? How many fish do you usually catch when you go?
- Introduce the activity. Let students know that they will compete to see who can catch the most fish in the class, and that they will get a turn to be a commercial fisherman and a recreational fisherman

Activity Procedure

- Students will be separated into two groups: recreational fishermen and commercial fishermen
- At no point during this activity will more fish be added to the stock.
- The first round will be the recreational fishermen's turn, and it will last 30 seconds
 - The teacher will let all the recreational fishermen go pick up 1 fish at a time, return it to their home base, then go pick up another fish, return to their home base, etc.

- - Based on teacher's judgement, they may request that students can only walk in order to make the activity more safe
 - At the end of the first round, the recreational fishermen will count how many fish they captured and mark it on their fish count sheet
 - The teacher will make a note of how many fish the class caught
 - The teacher will establish a leaderboard, noting who caught the most fish
- The second round will be the commercial fishermen's turn, and it will last 30 seconds
 - The teacher will let the commercial fishermen go pick up as many fish as they can, and they don't need to return to their home base until the round is over
 - At the end of the second round, the commercial fishermen will count how many fish they captured and mark it on their fish count sheet
 - The teacher will make a note of how many fish the class caught
 - The teacher will update the leaderboard. Presumably, this is the round in which the most fish will be caught
- After rounds 1 and 2, the two groups will switch roles. The commercial fishermen will become recreational fishermen and the recreational fishermen will become commercial fishermen
- The procedure for rounds 1 and 2 will be repeated now that the groups have switched
- As the rounds progress, there will be fewer and fewer fish to catch. If there are no fish remaining at any point during the activity, the activity ends.
- The best fisherman will be crowned the champion of the class!
 - Have a quick discussion with the students once the activity has concluded and ask the champion which role they played first. They were likely a commercial fisherman when fish were plentiful, which is an important thing to notice

Elaboration

- The teacher will show the class how many fish were caught during each round, it's assumed that there will be a decline in overall catch from round 1 to round 2
- Once the class has gotten a chance to see how much the fish stock has declined during just 4 rounds of the activity, slide 6 will introduce them to some of the terms necessary for the rest of the lesson
- Slide 7 introduces real Atlantic cod and sea scallop data from the NOAA Stock SMART database
 - Gives students a chance to read a graph made up of real data
 - This will show the students the connection between their activity and the real world
 - Students should begin to consider their impact on fish as a resource, and the teacher should emphasize the fact that taking too much of the resource too quickly will result in overfishing
 - It's important to note that commercial fishermen are not the problem. The emphasis should be on how scientists and fishermen should work together to find fair ways to divide up the fish

- The sea scallop data shows that, through effective fisheries management, fish stocks can grow over time
- Slide 9 asks the students to think critically about the lesson as a whole. How can fisheries be managed effectively? What ideas do the students have for fishermen and scientists?
 - Discuss what rules could have resulted in the differences between the scallop and cod fisheries

Discussion Questions

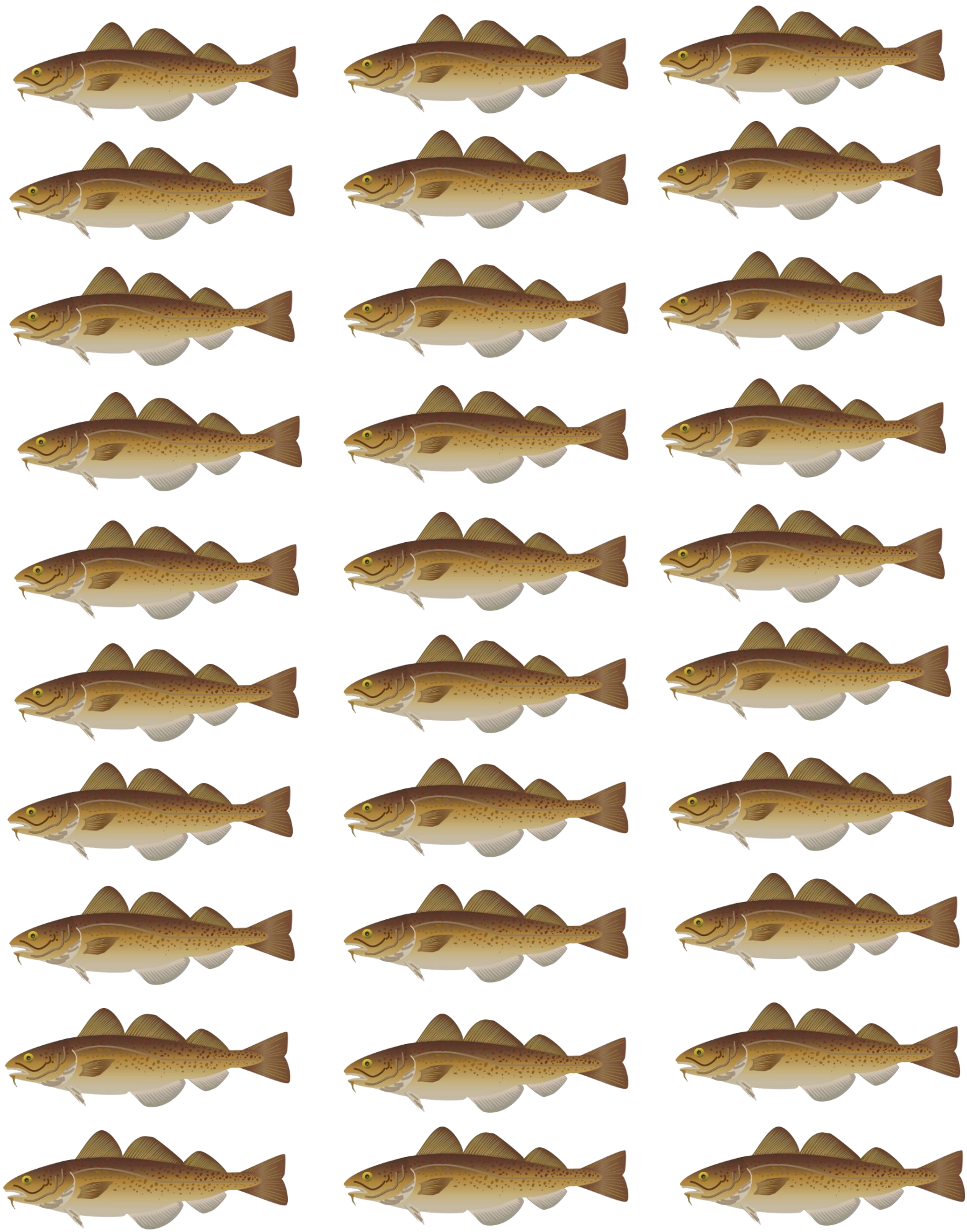
- Did you catch more fish as a recreational fisherman or a commercial fisherman?
 - Which job was easier, and why?
- Did you catch more fish in the first or second round?
 - Why?
 - Were you a commercial or recreational fisherman first?
- Who catches the fish you buy at the grocery store?
 - How do you know?
- What are some rules that scientists, the government, and the fishermen should come up with to make sure we do not catch all the fish at once?

Exit Ticket

Once the activity and discussion have concluded, they should complete the 2 question exit ticket.

Acknowledgments

Support for the lesson plan was provided by Virginia Scientists & Educators Alliance. Atlantic cod cutout image attribution: Kim Kraeer, Lucy Van Essen-Fishman, Integration and Application Network (ian.umces.edu/media-library). All images used in the *Going Fishing in the Classroom* PowerPoint have been given attribution on slide 9.



Fish Count Sheet

Round	Commercial (C) or Recreational (R) Fisherman	Number of Fish Caught
1		
2		
3		
4		

Going Fishing in the Classroom – Exit Ticket

Name:

Question 1: What's the difference between a commercial fisherman and a recreational fisherman?

Question 2: What are 2 things you learned during today's lesson?

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