

Lab: Tragedy of the Commons

You are to conduct a lab to experience how technology, population growth, and sustainable practices influence resources available from a common source. After you complete your lab, you will create dialogue to narrate a video about the Tragedy of the Commons. When you are finished with both parts of the lab, be sure to submit your assignment according to your teacher's instructions.

Materials

Plain M&M (14 oz bag)
Small plastic cups
Spoons

Peanut M&Ms (14 oz bag)
Plastic serving bowl
Straws

Part I:

Through a fishing simulation, you will model several seasons of a fishery and explore how technology, population growth, and sustainable practices impact fish catch and fisheries management.

You will need at least 4 other people to help you complete your lab, so ask your brothers and sisters to help, or invite a couple of friends over. This is also fun to do with your parents, so ask them if they will play along 😊.

Designate one person to be Mother Nature and the other four participants will be fishermen. Have Mother Nature place 20 plain and 10 peanut M&Ms into a serving bowl. Each fisherman should get a fishing rod and a basket – in this case, the fishing rod is a plastic straw and the basket to hold the catch are the small plastic cups.

Peanut M&Ms represent the largest and most valuable fish, while the plain M&Ms represent the smaller more common fish. Each fisherman's livelihood depends on catching fish. Therefore, in order to survive, each fisher must catch at least **two fish** (large or small) during each round.

During fishing season, the fisherman must hold their hands behind their backs and use their fishing rod (straw) to suck fish (M&Ms) from the ocean (bowl) and place them in their basket (cup). Mother Nature will designate when fishing season will begin and allow the season to continue for 20 seconds.

After the fisherman have been allowed to fish for the first season, each fisherman will count and record the number of small and large fish they caught. Fisherman who did not catch at least two fish have "died" and will not be able to fish during the next season. The fisherman who survive, benefit from "new technology" and can use their hands on the straws during the next season.

The fish remaining in the ocean after fishing season represent the breeding population and Mother Nature will add one new fish for every fish left in the ocean. Remember, big fish produce more big fish and small fish produce more small fish. After the fish have finished reproducing, Mother Nature will designate when the second fishing season will begin and allow the season to continue for 20 seconds.

After the second fishing season, each fisherman will count and record the number of small and large fish they caught. Again, fisherman who did not catch at least two fish have “died” and will not be able to fish during the next season. This time, only the most successful fisherman will benefit from “new technology” and can use a trawl net (spoon) during the next season.

After Mother Nature assists with the fish reproduction, the final fishing season can begin and continue for 20 seconds. Fisherman should record the number of fish caught and data should be gathered for final analysis.

Part II:

For this part of your assignment, you will create a new and thoughtful dialogue to narrate a video about the Tragedy of the Commons. You can use the video provided, find another video, or create your own video that represents this concept. As you prepare your dialogue consider what you learned and felt during the first part of the lab. This dialogue or monologue must be in your own words and express your perspective on the Tragedy of the Commons. It can be conversational or a voiceover explaining the events of the video, or combination of both styles. The final dialogue can be an audio recording or typed into a document.

Analysis

You can answer the following questions as part of your lab report or you can incorporate your responses as part of your dialogue for the video.

What are some examples of commonly owned resources on Earth? What happens when a commonly owned resource is overused?

For the fisherman, only two fish were required for survival. Were there any instances of collecting more fish than needed? What are the impacts of over fishing or exploiting a natural resource?

How are Earth’s common resources regulated? How can we establish and maintain the sustainable use of a resource?

Prepare a graph of the data collected from the lab. What does the data represent? What are the implications?

Familiarize yourself with the lab report rubric on the next page. This is the rubric that will be used to grade this assignment and throughout the course, so be sure to review it carefully.

AP Environmental Science Lab Report Rubric

When you complete your lab reports for this course, you will need to follow the guidelines included in the rubric below. Be sure to label each section of your lab report accordingly.

	Points Possible	Points Earned
Title <i>Prepare a specific and appropriate title that briefly describes the scope and purpose of your investigation.</i>	5	
Introduction <i>Develop 1-2 informative paragraphs that describe the initial observations; problem statement; background information including important terms and key points related to the investigation; the purpose of the investigation and how it relates to the topic of study; and a testable hypothesis written in an if/then/because or null/alternative format.</i>	15	
Materials & Procedures <i>Compile a complete listing of the materials and supplies used with the exact steps followed to conduct the investigation. The narrative should include enough detail in the experimental design so that others can duplicate the investigation. Be sure to identify the control, variables, and the measurement techniques used.</i>	10	
Data Collection <i>Record all qualitative and quantitative data collected during the investigation. Data should include raw data, field notes, pictures, or drawings presented in appropriately labeled data tables or diagrams.</i>	20	
Analysis & Discussion <i>Summarize results as an explanation of the data as presented in the appropriate graphs and charts. Graphs must include descriptive titles, axes labels, and a legend if necessary. All mathematical determinations should be figured with complete formulas and error analysis as necessary. Required questions and answers must be included. Show all calculations, including equations and computation.</i>	25	
Conclusion <i>Describe what your findings mean and relate them to conclusions you can draw from the data. Give valid explanation based on correct interpretation of results in relation to hypothesis. Where appropriate, compare results with accepted values. Evaluate procedure and results to discuss limitations, weaknesses, or sources of error. State realistic suggestions to improve the investigation and questions for further investigation.</i>	15	
Formatting <i>Paper is properly formatted following class guidelines for font, margin and page settings. All lab reports should include in-text citations and references to acknowledge the sources used to support findings and explanations.</i>	10	
Total Points	100	