GO FISH

1. GO FISH GAME INTRODUCTION master
2. TEACHER INSTRUCTIONS FOR PREPARING FISHERY STATUS REPORT ENVELOPES
3. FISHERY STATUS REPORT master
4. FISH CATCH DATA WORKSHEET master
5. GO FISH GAME PLAYING INSTRUCTIONS master
6. GO FISH GAME DISCUSSION QUESTIONS
7. Five sets of game cards
8. GO FISH HOMEWORK ASSIGNMENT master
GO FISH

To The Teacher

The primary purpose of this game is to help students discover several of the most important factors that determine the size of commercial fisheries in the Great Lakes. Some of these originate in nature while others result from decisions made by humans. Both sets of factors converge to have a determinative impact on fish populations and consequently on the vitality of the region's fishing industry.

A list of questions has been included with the activity to help the teacher focus student attention on the important inferences to be learned from the game. Many of these questions cannot be easily answered, but they should stimulate discussion and provide an opportunity for students to broaden their knowledge of factors affecting fish populations.

Objectives

1. Students should name three factors which affect the size of fish populations.

2. Students should name three factors which affect size of commercial fish catches (regulations, demand/supply, fish populations, technology, number of fishers on the lake).

3. Students should explain the effects of overfishing and underfishing on fish and on the market.

4. Students should explain why it is difficult for fishery management experts to predict the size and growth of fish populations.

5. Students should be able to discuss why fishers and fishery managers often disagree on how many fish should be caught.

6. Students should be able to compare the size of fish harvest in different Great Lakes and indicate which lakes could support highest and lowest catches.

Materials Provided

1. GO FISH GAME INTRODUCTION master
2. TEACHER INSTRUCTIONS FOR PREPARING FISHERY STATUS ENVELOPES
3. FISHERY STATUS REPORT master
4. FISH CATCH DATA WORKSHEET master
5. GO FISH GAME PLAYING INSTRUCTIONS master
6. GO FISH GAME DISCUSSION QUESTIONS
7. Five sets of game cards
   a. FISH LOST CARDS
   b. FISH GAINED CARDS
   c. BONUS CARDS
8. GO FISH HOMEWORK ASSIGNMENT master
Materials Required From Local Sources

1. One pair of dice for each group
2. One FISHERY STATUS REPORT envelope for each group
3. One FISH CATCH DATA WORKSHEET for each student
4. One GO FISH GAME INTRODUCTION for each student
5. One GO FISH GAME PLAYING INSTRUCTIONS for each group
6. One GO FISH HOMEWORK ASSIGNMENT for each student

Procedure

1. Cut out the game cards and divide into five sets.

2. Prepare FISHERY STATUS REPORT envelopes for the game as described on the page entitled, TEACHER INSTRUCTIONS FOR PREPARING FISHERY STATUS REPORT ENVELOPES.

3. Begin the activity by distributing a copy of GO FISH GAME INTRODUCTION to each student. Review the introduction with your students.

4. Explain the terms overfishing and underfishing.
   Overfishing - A condition where more fish are being taken out of the lake than can be replaced by natural reproduction. If overfishing persists, fish catches begin to drop and the fish population may eventually be depleted. For the purposes of the GO FISH game, a group will have overfished if 50 tons or less of fish remain in their lake at the end of the game.
   Underfishing - A condition where the fish population becomes very large because too few fish are being taken. Fish are crowded and compete for a limited food supply. As a result, the fish can not grow to a good size. For the purposes of the GO FISH game, a group will have underfished if 1800 tons or more of fish remain in their lake at the end of the game.

5. Divide the class into five groups of five each. You may need to add a sixth member to a group if you have a large class.
6. Distribute the following materials to each group:
   a. One copy of FISH CATCH DATA WORKSHEET for each student
   b. One copy of GO FISH GAME PLAYING INSTRUCTIONS
   c. One set of dice
   d. One set of game cards placed text side down.
   e. One FISHERY STATUS REPORT envelope. Tell your students not to open their envelope until the end of the game.

7. Review GO FISH GAME PLAYING INSTRUCTIONS with your students. Explain that GO FISH is played in years, each year equals three circulations of the dice around the group.

8. Review one year of the game. Each year is played as follows:
   a. Each group should begin the year by drawing the top Fish Lost Card and top Fish Gained Card. Someone in the group should read it aloud and record the numbers of fish tons lost and gained under the appropriate heading on their FISHERY STATUS REPORT envelope.
   b. Next, each player rolls the dice in turn to determine their catch. This should be done by each player three times per year. After each roll, the player should record their catch on their FISH CATCH DATA WORKSHEET. Each dot on the dice represents one ton of fish caught. If a player rolls a double, the player may select a card from the Bonus Card pile. The bonus card gives the player an additional increment of fish caught.
   c. At the end of each year the players should add up their individual catches to get their annual catch. This is recorded on the FISH CATCH DATA WORKSHEET. The group should then determine their GROUP FISH CATCH and record this on the FISHERY STATUS REPORT envelope.
   d. This is the end of one year of play. This procedure is then repeated four more times to complete the game.

9. Let students begin playing GO FISH. Game playing is finished at the end of five years of play.

10. As each group completes five years play, tell them to complete their final calculations as outlined on their FISHERY STATUS REPORT envelope.

11. Using the GO FISH GAME DISCUSSION QUESTIONS review the activity with your students.


13. Discuss the homework assignment with the class the following day.
GO FISH GAME INTRODUCTION

The GO FISH GAME activity demonstrates how human and natural factors affect the size of fish populations in the Great Lakes.

Each student will play the part of a commercial fisher on one of the Great Lakes. All the students fishing on the same lake represent a fishing group. Each group will affect the size of the fish population in their lake through each member's fishing effort. Fish are caught by rolling the dice. Each dot on the die is equal to one ton of fish.

The size of the fish population in each lake will also be affected by natural factors. In the GO FISH GAME, natural factors are represented by Fish Lost and Fish Gained cards.

The first objective of the game is for each player to stay in business. To do this you must catch an average of 20 tons or more of fish per year for five years. If you catch less than this amount you will be unable to make a sufficient income from the sale of your fish. The game winner is the student who has the largest five year average catch over the 20 ton minimum.

The second objective of the game is for each fishing group not to underfish or overfish the lake.

Overfishing and underfishing are determined at the end of five years. If the fish population remaining in your lake at the end of five years is 1800 tons or more, you have underfished the lakes. This results in the fish population growing so large that all fish become undersized due to crowding. If the fish population remaining in your lake at the end of five years is 30 tons or less, you have overfished the lake. As a result the fish population has been reduced to such a low level that the fish cannot reproduce fast enough to meet the minimum needs of the fishers.

If your group overfishe or underfishes your lake, the entire group loses; there can be no individual winner in these cases.
Each group begins the game with a healthy lake. You will not, however, know how many fish there are in your lake. The sealed FISHERY STATUS REPORT envelope your group receives will contain a slip of paper indicating the original fish population of your lake. But this envelope may not be opened till you have completed five years of fishing.

At the end of five years fishing each group may open their FISHERY STATUS REPORT envelope and determine the condition of the fishery in their lake. At that time you will determine if you overfished or underfished your lake and whether you are still in business.

Fish catch bonuses can be gained by rolling doubles. When a player rolls doubles, he or she decides whether or not to take a card from the Bonus Card pile. The Bonus Card will give you more fish. If you want to protect your fish harvest in the future, you can decide not to take the bonus card. On the other hand, you may decide to take the bonus card because you need it to stay in business (a player must catch an average of 20 tons of fish per year to stay in business). A player may also want to take the bonus because he or she wants to win the game. In real life, increased fish catches usually mean increased income for fishers.
TEACHER INSTRUCTIONS FOR PREPARING FISHERY STATUS REPORT ENVELOPES

Each group will need an envelope prepared as illustrated on the FISHERY STATUS REPORT master. Each envelope will represent one of the five Great Lakes.

Preparing Envelopes

1. Make five copies of the FISHERY STATUS REPORT master.

2. Cut each copy along dashed lines and attach to the front of a standard 4½ x 9½ inch white envelope.

3. Write the name of a different Great Lake (Erie, Huron, Michigan, Ontario, and Superior) on each envelope in the space provided.

4. Inside each of the envelopes place a slip of paper marked as follows:
   For Lake Erie the slip of paper should read 2,600 tons
   Lake Michigan = 1800 tons
   Lake Superior = 400 tons
   Lake Huron = 290 tons
   Lake Ontario = 100 tons
   These numbers correspond to the relative abundance of fish in each of the five Great Lakes. The figures are based on fish catch data for each Lake.

5. Seal the envelopes.

6. Distribute envelopes as indicated in step seven of Procedure.
# FISHERY STATUS REPORT

Lake __________

<table>
<thead>
<tr>
<th>Fish Gained</th>
<th>Fish Lost</th>
<th>Group Fish Catch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td><strong>Year</strong></td>
<td><strong>Year</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

To determine the condition of the fishery in your lake use the following equation.

\[
\text{Original fish population} + \text{Total Fish Gained} - \text{Total Fish Lost} - \text{Total Group Fish Catch}
\]

You have been successful if there are between 30-1800 tons of fish in your lake.
If there are less than 30 tons of fish left you have overfished.
If there are more than 1800 tons of fish in the lake you have underfished.
What is the condition of the fishery in your lake?
Will it be possible for commercial fishing to continue?
FISH CATCH DATA WORKSHEET

1. After each of your turns with the dice record your catch below.

2. If you roll doubles and decide to take the bonus, record the bonus amount in the space provided.

3. At the end of each year record your annual Fish Catch. To get your Annual Fish Catch add together your three catches plus any bonuses you received.

4. When everyone in your group has determined their Annual Fish Catch, add each member's total to get Group Fish Catch. Record this amount on your FISHERY STATUS REPORT Envelope.

5. At the end of five years add up your Annual Fish Catches to get your 5-year fish catch. Divide this number by 5 to get your average annual catch. To stay in business your catch must average 20 tons per year.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Turn 1.</th>
<th>Tons of fish caught</th>
</tr>
</thead>
<tbody>
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<table>
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<tr>
<th>Year 2</th>
<th>Turn 1.</th>
<th>Tons of fish caught</th>
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<td>Turn 1.</td>
<td>Tons of fish caught</td>
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</tr>
<tr>
<td>Turn 2.</td>
<td></td>
<td>Tons of fish caught</td>
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<tr>
<td>Turn 3.</td>
<td></td>
<td>Tons of fish caught</td>
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<tr>
<td>Bonus</td>
<td></td>
<td>Tons of fish caught</td>
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<tr>
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<td></td>
<td>Tons of fish caught</td>
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<tr>
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<td></td>
<td><strong>Tons</strong></td>
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<td>Tons of fish caught</td>
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<td>Tons of fish caught</td>
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<td></td>
<td>Tons of fish caught</td>
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<td></td>
<td><strong>Tons</strong></td>
</tr>
</tbody>
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**My 5-year Fish Catch was** | **Tons**

**My Average Annual Catch was** | **Tons**

Are you still in business?
GO FISH GAME PLAYING INSTRUCTIONS

1. Obtain the following materials.
   a. A FISH CATCH DATA WORKSHEET for each player
   b. A sealed FISHERY STATUS REPORT envelope
   c. Several pencils
   d. A pair of dice
   e. One set of game cards
      i. Fish Lost Cards
      ii. Fish Gained Cards
      iii. Bonus Cards

2. Place the game cards in the middle of the group. Fish Lost, Fish Gained, and Bonus Cards should be separated from each other. Place each set of cards on the table so that the words Fish Lost Card, Fish Gained Card, and Bonus Card face up.

3. Select one person from your group to record information on the FISHERY STATUS REPORT envelope.

4. Have each person role the dice. The student with the highest number goes first.

5. Begin the game by having the first player draw the top Fish Lost and Fish Gained Card. He or she should read aloud the cards to the group. The recorder should record the amounts of fish lost and fish gained in the appropriate column of the FISHERY STATUS REPORT envelope. Once this is done return the two cards to the bottom of their respective piles.
6. The first player then rolls the dice. Each dot represents one ton of fish. Total tons caught on each role should be recorded by the player on his or her FISH CATCH DATA WORKSHEET.

7. Each player in turn then does the same. The dice move around the group in a clockwise direction.

8. If a player rolls doubles, he or she may elect to pick a bonus card. If a player decides not to take the bonus, play continues with the next player. If player decides to take the bonus he or she picks the top Bonus Card. Read the card aloud and record the amount indicated on your FISH CATCH DATA WORKSHEET under Bonus and return card to bottom of pile. Remember to also record your fish catch from the roll of the dice. Play then continues with next player.

9. When each player in the group has had three turns, a year of fishing has been completed. Each player should then determine their total catch for the year. Record this amount on your FISH CATCH DATA SHEET. Then add each player's total together to get a group total. Your recorder should record this amount in the column marked GROUP FISH CATCH.

10. Shuffle each of the card decks before beginning the next year of play.

11. Repeat steps 5-10 four more times to complete five years of fishing.
12. After calculations for year five are completed, each player should determine his/her average yearly catch. This is done by first adding your yearly catches together. Then divide by five. This gives you a yearly average. Record these amounts at the bottom of your FISH CATCH DATA WORKSHEET.

13. Determine the condition of the Fishery in your Lake. Begin by summing each of the columns on your FISHERY STATUS REPORT. Then fill in the numbers on the equation given. To find your lake's original fish population, open the envelope and pull out and read the slip of paper.

14. Answer the two questions at the bottom of your FISHERY STATUS REPORT ENVELOPE. If the remaining sum is greater than 1800 tons all of the players will have lost because the fish population is so large that no fish grow large enough to meet the minimum size required for taking. Fishers will have to wait over five years for the population to be reduced by natural causes before fish grow big enough to be taken. If the sum remaining is less than 30 tons all the players lose because they have overfished the lake. The fish population has been reduced to such a low level that the fish cannot reproduce fast enough to meet the minimum need of the fishers. The fish population may never recover. If the remaining sum falls in neither of the above categories the players compare their respective catches and the player with the greatest average tonnage over 20 tons wins.

15. Collect game cards and dice. Return these items to your teacher.

16. Game over.
GO FISH GAME DISCUSSION QUESTIONS

1. How many groups were able to not underfish or overfish?

2. How many students were able to stay in business by catching an average of 20 tons or more of fish per year for five years? Who was the winner on each lake? (Remember, for players to be eligible to win their groups must not have underfished or overfished their lake.)

3. In GO FISH you caught fish by rolling dice. How many fish you caught depended on luck. In a real fishing situation luck can also play a role in how many fish you catch. Besides luck, what other factors affect the number of fish caught? (Size of fish populations, the types of equipment used, market demand for fish, regulations).

4. What factors affect the size of fish populations in a lake? (fishing effort, disease, food supply, climate, water quality, available habitats).

5. Based on the original fish population for each lake, which lake is the most productive? (Lake Erie); which lake is the least productive? (Lake Ontario); which lake can support the highest fish catch? (Lake Erie); which lake can support the lowest fish catches? (Lake Ontario).

6. How and why did students decide to take or reject their bonuses? Was there any incentive not to take a bonus? In real life, is there any incentive for a commercial fisher not to take as many fish as he or she can?
7. What would happen to a fishery if fishers went out and caught as many fish as they wanted?

8. In real life, who has the responsibility for determining how many fish can be caught? (usually the state department of natural resources or a similar agency is responsible for setting catch limits on specific fish species.)

9. Imagine that you are a department of natural resources official in charge of fishing. Whose side are you on—the fish or the fishers? Should fish catch limits be based on how much money the commercial fisher needs to make? Should they be set on how much food people need to eat and are able to afford? Should they be set on the health of the fishery?

10. Would it be better for fish managers to limit the number of fish caught, the number of fishers, or plant more hatchery fish in the Lakes?

11. Is voluntary compliance with regulations likely to work?

12. Since the Great Lakes border on eight states and one province, what difficulties might there be in regulating the fishery?

13. How does environmental quality affect fishing?
<table>
<thead>
<tr>
<th>Soil Conservation Program Reduces Siltation, Many Fish Eggs Survive.</th>
<th>Young Fish Free of Disease, Many Survive.</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 Tons of Fish Gained</td>
<td>80 Tons of Fish Gained</td>
</tr>
<tr>
<td>Good Year, Many Young Fish Survive.</td>
<td>Sea Lamprey Controlled</td>
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<td>60 Tons of Fish Gained</td>
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<td>New Anti-Pollution Laws Improve Nearshore Waters Where Fish Spawn.</td>
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<td>Wetlands Protection Law Passed. Young Fish Survive in Large Numbers.</td>
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YOUNG FISH FREE OF DISEASE, MANY SURVIVE.

80 TONS OF FISH GAINED

GOOD YEAR, MANY YOUNG FISH SURVIVE.

120 TONS OF FISH GAINED

SEA LAMPREY CONTROLLED

60 TONS OF FISH GAINED

LARGE NUMBER OF HATCHERY FISH RELEASED.

90 TONS OF FISH GAINED

NEW ANTI-POLLUTION LAWS IMPROVE NEARSHORE WATERS WHERE FISH SPAWN.

80 TONS OF FISH GAINED

PERFECT WATER TEMPERATURE DURING WINTER SPawning SEASON, LARGE NUMBER OF FISH HATCH.

110 TONS OF FISH GAINED

WETLANDS PROTECTION LAW PASSED. YOUNG FISH SURVIVE IN LARGE NUMBERS.

100 TONS OF FISH GAINED
FISH GAINED CARDS

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<tr>
<th>MAJOR SPAWNING GROUND DREDGED TO BUILD HOTEL MARINA.</th>
<th>WHITEFISH FOOD SUPPLY (ALEWIFE YOUNG) MUCH REDUCED. MANY WHITEFISH STARVE.</th>
</tr>
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<tbody>
<tr>
<td>30 TONS OF FISH LOST</td>
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<td>WHITEFISH FOOD SUPPLY (ALEWIFE YOUNG) MUCH REDUCED. MANY WHITEFISH STARVE.</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
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148
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<tr>
<th>Major Spawning Ground Dredged to Build Hotel Marina.</th>
<th>Whitefish Food Supply (Alewife Young) Much Reduced. Many Whitefish Starve.</th>
</tr>
</thead>
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<td>30 Tons of Fish Lost</td>
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<th>Heavy Lamprey Predation on Large Fish.</th>
<th>Gillnets Make Large Catch.</th>
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<th>Wetlands Spawning Ground Filled In for Industrial Park.</th>
<th>Sudden Spring Snowmelt Brings Road Salt To Bog. Many Young Fish Die.</th>
</tr>
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FISH LOST CARDS

MAJOR SPawning GRound Dredged To Build Hotel Marina.

30 Tons of Fish Lost

WHITEFISH Food Supply (ALEwife Young) Much Reduced. Many Whitefish Starve.

10 Tons of Fish Lost

Heavy Lamprey Predation On Large Fish.

70 Tons of Fish Lost

Gillnets Make Large Catch.

10 Tons of Fish Lost

Bad Weather Stirs Up Fish Eggs in Shallow Water.

40 Tons of Fish Lost

Factory Accident Releases Pollutants Into Lake. Kills Major Fish Food (the freshwater shrimp).

50 Tons of Fish Lost

Wetlands Spawning Ground Filled In For Industrial Park.

20 Tons of Fish Lost

Sudden Spring Snowmelt Brings Road Salt to Bog. Many Young Fish Die.

10 Tons of Fish Lost
| **MAJOR SPAWNING GROUND DREDGED TO BUILD HOTEL MARINA.** | **WHITEFISH FOOD SUPPLY (ALEWIFE YOUNG) MUCH REDUCED. MANY WHITEFISH STARVE.** |
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### Bonus Cards

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<th>You have installed a depth recorder. This device helps you locate fish.</th>
<th>Certain temperature ranges are more attractive to fish. You find an area with the right water temperatures.</th>
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<table>
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150
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GO FISH HOMEWORK ASSIGNMENT

Imagine your local pet store owner's aquariums. The owner may have 30 fish tanks. He or she periodically buys more fish from a wholesaler. Meanwhile, customers continuously buy fish for their tanks at home.

The owner wants to have a certain number of fish in the store at any time. Too many fish will crowd the tanks and too few will give poor selection for the customers.

A government fishery manager's job is similar to that of the pet store owner. His or her job is to make sure there will always be enough fish. A lake or river is usually the fishery manager's tanks. Commercial and sport fishers are his or her customers.

Compare the similarities and differences between a pet store owner's job and the job of a government fishery manager for one of the Great Lakes.

1. Can they know just how many fish are in the store or the lake?

2. Can they know the number of fish entering and leaving their store or lake?

3. What can they do to control the number of fish in their store or lake?
COMMERCIAL FISHING

JOBS AND PROFESSIONS

1. MARINE ECONOMICS DATA-Supplementary Material
2. FISHING COMPANY INSTRUCTIONS master
3. TALLY SHEET master
4. FISHING COMPANY CHOICES master
5. FISH BUYER INSTRUCTIONS and ROLE DESCRIPTIONS master
6. DAY-TO-DAY DILEMMAS IN FISHING master
COMMERCIAL FISHING: JOBS AND PROFESSIONS

To the Teacher

Until recently, commercial fishing businesses on the Great Lakes were often small family operations. Fishing was the kind of work which pervaded all aspects of the families’ lifestyle. The business was often handed down from one generation to the next. Today, because of legal limitations on fishing, declining fish populations, and the toxic substance problem, few families are able to make a living from fishing.

COMMERCIAL FISHING: JOBS AND PROFESSIONS is a simulation of a small fishing business on the Great Lakes. Each of your students will be asked to make choices and decisions necessary for starting and operating such a business. Their task will be to design an efficient fishing operation. In the process of making these choices students will consider a variety of job, people and organizational issues. In addition, they will become acquainted with the technology used in commercial fishing.

Your students’ goal will be to win a fishing contract by organizing an efficient fishing company. Working in groups, they will create fishing companies by choosing from a set of crew members, boats, gear, and processing equipment. Students will evaluate the tradeoffs between the various choices in setting up their fishing company.

Each of the students’ choices has three types of “cost”: Cost, Time, and Risk. The Cost factor is roughly analogous to the actual costs of a commercial fishing operation. The Time factor is the amount of time required for the catching, processing and delivery of the fish—a sort of efficiency factor. Those alternatives that increase the chances of accidents, or impair the delivery of fish are assigned a numerical Risk factor. After all the choices have been made, the sum of the Risk factors is used to determine the operator’s insurance premium. Risk also indicates the reliability of the operation. Total Cost, Time and Risk factors will be displayed as the group’s bid for a fishing contract. The actual Cost of two fishing company operations have been included for your information (see Marine Economics Data-supplementary material).

Objectives

1. Each student will be able to describe the responsibilities of three jobs in a fishing operation.

2. Each student will be able to list at least four jobs outside fishing that help make fishing possible.

3. Each student will be able to list and describe at least five machines or tools that make fishing possible, easier or safer.

4. Generalizing from their experience with this activity, students will be able to identify four factors (e.g. management, personnel, capital, markets) that must be considered when organizing and operating a business.

5. Each student will be able to identify two advantages and two disadvantages of working in a family operated business.
Materials Provided

1. MARINE ECONOMICS DATA-Supplementary Material
2. FISHING COMPANY INSTRUCTIONS master
3. TALLY SHEET master
4. FISHING COMPANY CHOICES master
5. FISH BUYER INSTRUCTIONS AND ROLE DESCRIPTIONS master
6. DAY-TO-DAY DILEMMAS IN FISHING master

Materials Required from Local Sources

1. One copy of each of the following for each group:
   A. FISHING COMPANY INSTRUCTIONS
   B. TALLY SHEET
   C. FISHING COMPANY CHOICES
   D. DAY TO DAY DILEMMAS IN FISHING

2. Newsprint, scissors, scotch tape, and felt-tip marker for each group.

3. Three copies of FISH BUYER INSTRUCTIONS AND ROLE DESCRIPTIONS, one for each buyer.

Procedure

1. Invite three persons to your class to play the part of Fish Buyers. Use three of your students if this is not possible. Give each Fish Buyer a copy of FISH BUYER INSTRUCTIONS AND ROLE DESCRIPTIONS and assign one of the Fish Buyer roles to each.

2. Give your students a brief introduction to the COMMERCIAL FISHING: JOBS AND PROFESSIONS activity.

3. Divide the class into groups of four or five students. Each group will act as the management/owners of a commercial fishing business.

4. Give each group one copy of each of the following:
   A. FISHING COMPANY INSTRUCTIONS
   B. TALLY SHEET
   C. FISHING COMPANY CHOICES

   Also give each group a pair of scissors, tape, a felt-tipped marker, and one sheet of newsprint.
5. Review these materials with your students. The FISHING COMPANY INSTRUCTIONS given to each group are intended for their use as a reference during the activity. Encourage your students to use these instructions if they have questions. Advise students that they will be assessed a consulting fee Cost of 5 each time they ask for your help. (These charges begin after you have completed reviewing the materials distributed in procedure number 4.) Any consulting fees incurred by a company are recorded on their TALLY SHEET.

The TALLY SHEET is used to record the Cost, Time, and Risk numbers associated with the alternatives selected by the company. It also contains instructions for computing the company's total Cost, Time, and Risk. The TALLY SHEET is a company ledger. Fish Buyers will use the TALLY SHEETS to help them decide which company should receive their contract. They will be looking for a company which can supply them with fish at a reasonable Cost, Time, and Risk.

The FISHING COMPANY CHOICES list all the choices each company will have to make to set up their company. Each choice has several alternatives and each alternative has varying Cost, Time, and Risk. After a company has carefully considered the value of each alternative in a choice, they should select the one which is best for their company. Which alternative is best for a company depends on what contract or contracts they are trying to win. The alternative selected is cut out and set aside and its Cost, Time, and Risk are recorded on the TALLY SHEET.

The newsprint is used to display the alternatives selected and the completed TALLY SHEET.

6. Ask each Fish Buyer to explain their role to the class. They should describe the business they represent and indicate what kind of fish they are interested in buying.

7. Have each company begin making their choices. The first thing the groups should do is name their company. The company name should be printed on their newsprint and TALLY SHEET.

8. Ask the Fish Buyer to circulate quietly among the group. This is a good time for them to discuss their needs with the Fishing Companies.

9. After a company has completed making their choices, two or three members should attach their alternatives onto newsprint. The alternatives should be arranged by categories (boat and equipment, crew, supplies, etc.). The other company members should complete the TALLY SHEET. Each company needs to calculate the total Cost, Time, and Risk for their business. Instructions for doing these calculations are included in the TALLY SHEET. When the TALLY SHEET is completed it should be attached to the company's sheet of newsprint.

10. Have each company post their newsprint on the wall so that Fish Buyers and other students can see them.
11. After a company has posted their sheet of newsprint give them a copy of DAY-TO-DAY DILEMMAS IN FISHING to solve.

12. Fish Buyers should review the fishing companies’ newsprint as they are posted.

13. After all companies have posted their newsprint, review with your class the answers to DAY-TO-DAY DILEMMAS IN FISHING. During this time each Fish Buyer should decide which company will receive their contract.

14. When you have completed reviewing the answers to DAY-TO-DAY DILEMMAS IN FISHING have each Fish Buyer announce their decisions. Each should explain why they picked one company over the others.

15. Review the activity with a class discussion. The following questions will help identify important learnings.

   a. How does the Fish Buyer decide what to pay for fish?

   b. How does the popularity or demand for a type of fish affect its price?

   c. What could a fishing business do if they could not sell their fish because of chemical contamination?

   d. Many fishing operations are family businesses. What are the advantages and disadvantages of being in business with your family?

   e. How could an individual develop the skills necessary to become a commercial fisher?
MARINE ECONOMICS DATA - 40-FOOT TRAP NET BOAT, NORTHERN LAKE
MICHIGAN AND NORTHERN LAKE HURON (MM-3, MI-1) a/

Description
$34,000 market value, 40-foot steel hull, 170 HP diesel engine,
radio, radar, net puller, 18 trap nets, 216 double-fluke anchors.

<table>
<thead>
<tr>
<th>Fishery</th>
<th>Effort (days)</th>
<th>Effort (lifts)</th>
<th>Price Per ton ($)</th>
<th>Price Per lb. ($)</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Whitefish</td>
<td>94</td>
<td>?</td>
<td>1,260</td>
<td>.63</td>
<td>40.84</td>
</tr>
</tbody>
</table>

(1) Gross returns ................................................................. $ 51,458

Variable Costs c/

<table>
<thead>
<tr>
<th>Item</th>
<th>Season Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crewshare (33.3% of gross returns)</td>
<td>$ 17,150</td>
</tr>
<tr>
<td>Net materials and repairs</td>
<td>$ 3,100</td>
</tr>
<tr>
<td>Vessel repairs</td>
<td>$ 1,500</td>
</tr>
<tr>
<td>Transportation</td>
<td>$ 1,000</td>
</tr>
<tr>
<td>Fuel and oil</td>
<td>$ 2,000</td>
</tr>
<tr>
<td>Ice</td>
<td>$ 1,250</td>
</tr>
<tr>
<td>Boxes</td>
<td>$ 3,255</td>
</tr>
<tr>
<td>Clothing</td>
<td>$ 250</td>
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(2) Total variable costs ........................................................ $ 29,505

Fixed Costs d/

<table>
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<tr>
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<th>Season Total</th>
</tr>
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<tbody>
<tr>
<td>Depreciation</td>
<td>$ 2,800</td>
</tr>
<tr>
<td>Property tax</td>
<td>$ 700</td>
</tr>
<tr>
<td>License fees</td>
<td>$ 250</td>
</tr>
<tr>
<td>Rent</td>
<td>$ 2,000</td>
</tr>
<tr>
<td>Utilities</td>
<td>$ 875</td>
</tr>
<tr>
<td>Insurance</td>
<td>$ 300</td>
</tr>
<tr>
<td>Property repairs and materials</td>
<td>$ 750</td>
</tr>
<tr>
<td>Association dues and related expenses</td>
<td>$ 500</td>
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</table>

(3) Total fixed costs .......................................................... $ 8,175

Opportunity Costs e/

(4) Operator's Labor (2,080 hours at $3.25 per hour) .................... $ 6,760
(5) Operator's Management (10% of Gross) ................................... $ 5,146
(6) Total Investment ($34,000 at 8%) ...................................... $ 2,720

Total Opportunity costs ....................................................... $ 14,626
Summary

Return to labor, management and investment
(1) less (2) and (3) ........................................ $ 13,778
Return to labor and management
(1) less (2), (3) and (6) .................................... 11,058
Return to investment
(1) less (2), (3), (4) and (5) .............................. 1,872

a/ Developed in 1976 by selected trap net fishermen in cooperation with the Michigan Sea Grant Program and the Michigan State University Cooperative Extension Service. These data are representative of a typical operation for this area. Compiled by Frank Pattiason and Daniel Talhelm. The data are representative of prices and conditions in 1973.

b/ Effort, price and production data are derived from catch and effort reports provided by the Michigan Department of Natural Resources.

c/ Costs which vary with fishing effort. Does not include operator or family labor.

d/ Costs which do not vary with fishing effort.

e/ Opportunity cost of labor is the estimated value of the operator's time, or what could have been earned working for someone else. Opportunity cost of management is the estimated value of the operator's management (decision-making and risk), or what could have been earned managing another similar business. Opportunity cost of investment is the estimated fair return to total investment in the business, regardless of the actual amount of debt.

For further information about using marine economics data, see:


MARINE ECONOMICS DATA - 40-FOOT MARQUETTE TRAP NET BOAT AND 45-FOOT GILLNETTER \(^a/\)

**Description**

$20,000 market value, 40-foot steel hull trap net boat, 170 HP diesel engine, FM radio, hydraulic winch, 12 nylon trap nets, 144 65-lb double-fluke anchors, 58,000 feet of 3/8-inch polypropene rope.

$35,000 market value, 45-foot steel hull gillnetter, FM radio, sonnder, lifter, 50,000 feet of 2 5/8-inch nylon gill nets.

Total market value: $55,000

<table>
<thead>
<tr>
<th>Fishery</th>
<th>Effort (^b/)</th>
<th>Price</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(days)</td>
<td>(lifts)</td>
<td>Per ton ($)</td>
</tr>
<tr>
<td>Trap net</td>
<td>79</td>
<td>249</td>
<td>1,420</td>
</tr>
<tr>
<td>Lake Whitefish</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(days)</th>
<th>(1,000 ft. lifted)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 1/2-inch gill net</td>
<td>22.5</td>
<td>259.5</td>
<td></td>
</tr>
<tr>
<td>Lake Whitefish</td>
<td>1,360</td>
<td>.68</td>
<td>3.8</td>
</tr>
<tr>
<td>Lake Trout (incidental)</td>
<td>1,440</td>
<td>.72</td>
<td>1.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(days)</th>
<th>(lifts)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 5/8-inch gill net</td>
<td>73</td>
<td>625.5</td>
<td></td>
</tr>
<tr>
<td>Chubs</td>
<td>860</td>
<td>.43</td>
<td>9.9</td>
</tr>
<tr>
<td>Lake Herring (incidental)</td>
<td>540</td>
<td>.27</td>
<td>3.4</td>
</tr>
</tbody>
</table>

(1) Gross returns.................................................. $74,486

<table>
<thead>
<tr>
<th>Variable Costs (^c/)</th>
<th>Gill</th>
<th>Trap</th>
<th>Season Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crewshare..................</td>
<td>$5,841</td>
<td>$23,944</td>
<td>$29,785</td>
</tr>
<tr>
<td>Net materials and repair</td>
<td></td>
<td></td>
<td>1,505</td>
</tr>
<tr>
<td>Vessel repairs.............</td>
<td>2,500</td>
<td>1,500</td>
<td>4,000</td>
</tr>
<tr>
<td>Transportation.............</td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>Fuel and oil..............</td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>Boxes........................</td>
<td></td>
<td></td>
<td>2,440</td>
</tr>
<tr>
<td>Hardware...................</td>
<td></td>
<td></td>
<td>230</td>
</tr>
</tbody>
</table>

(2) Total variable costs........................................... $40,960

<table>
<thead>
<tr>
<th>Fixed Costs (^d/)</th>
<th>Gill</th>
<th>Trap</th>
<th>Season Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation.........</td>
<td>$2,000</td>
<td>$1,500</td>
<td>$3,500</td>
</tr>
<tr>
<td>Rent on property.....</td>
<td>375</td>
<td>375</td>
<td>750</td>
</tr>
<tr>
<td>License fees..........</td>
<td>150</td>
<td>120</td>
<td>270</td>
</tr>
<tr>
<td>Utilities..............</td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>Insurance..............</td>
<td>1,000</td>
<td>1,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>
Fixed Costs (continued)  Gill  Trap  Season Total

Property repairs and materials........................................... $ 2,000
Legal expenses............................................................... 350
Association dues and related expenses......................... $ 190  $ 396  586
Clothing........................................................................... 400

(3) Total fixed costs............................................................. $ 11,356

Opportunity Costs

(4) Operator's Labor (2,080 hours at $3.25 per hour)................. $ 6,760
(5) Operator's Management (10% of Gross)............................ 7,449
(6) Total Investment ($55,000 at 8%)................................. 4,400

Total Opportunity Costs...................................................... $ 18,609

Summary

Return to labor, management and investment
( (1) less (2) and (3) )................................................................. $ 22,170

Return to labor and management
( (1) less (2), (3) and (6) )......................................................... 17,770

Return to investment
( (1) less (2), (3), (4) and (5) )................................................. 11,010

---

a/ Developed in 1976 by selected Marquette fishermen in cooperation with the Michigan Sea Grant Program and the Michigan State University Cooperative Extension Service. These data are representative of a typical operation for this area. Compiled by Frank Pattison and Daniel Talhelm. The data are representative of prices and conditions in 1973.

b/ Effort, price and production data are derived from catch and effort reports provided by the Michigan Department of Natural Resources.

c/ Costs which vary with fishing effort. Does not include operator or family labor.

d/ Costs which do not vary with fishing effort.

e/ Opportunity cost of labor is the estimated value of the operator's time, or what could have been earned working for someone else. Opportunity cost of management is the estimated value of the operator's management (decision-making and risk), or what could have been earned managing another similar business. Opportunity cost of investment is the estimated fair return to total investment in the business, regardless of the actual amount of debt.

For further information about using marine economics data, see:

To The Student

FISHING COMPANY INSTRUCTIONS

Your group's job is to set up a commercial fishing company and stay in business. To set up your company you will have to make decisions about crew, boat, equipment, and other items.

To stay in business you will have to win a contract from a Fish Buyer. Fish Buyers buy fish from commercial fishers and sell the fish to restaurants, supermarkets, and fertilizer or fish meal factories.

There will be three Fish Buyers in your class. Each will be looking for a dependable fishing company that can supply him or her with fish. To win a contract your company will have to offer better service than the other companies in your class.

The instructions which follow explain how to set up your fishing company.

IMPORTANT: Read these instructions carefully. Every Time you call on the teacher for advice, he or she will charge you a consulting fee. Add a Cost factor of 5 to your TALLY SHEET each Time you ask. (Add fees under the Administration section of your TALLY SHEET.)

1. Select a name for your Fishing Company.

2. Print the name of your company on your sheet of newsprint and on your TALLY SHEET.

3. Decide which contract or contracts your Company would like to win. You might decide to try for one or all three.

4. Set up your Fish Company.

a. Using the FISHING COMPANY CHOICES, your Company must buy a boat and fishing equipment, hire a crew, and obtain other items. For each choice there are several alternatives from which you may only select
one. For example, under the choice of Fishing Crew there are three Fishing Captains listed. You may only select one Captain. You will have to decide which Captain can do the best job for your Company.

b. Each alternative has its own Cost, Time, and Risk factors. The Cost number tells you how much money that alternative will cost you. The Time number tells you how much Time the alternative will add to catching, processing, or delivering fish. Risk estimates possible delays you may encounter in delivering fish to buyers. These delays might be caused by such things as accidents and mistakes. Risk will also be used to determine your Company's insurance Cost.

Fish Buyers will carefully study your Cost, Time, and Risk when deciding which company should receive their contract.

c. Work your way through all the choices. For each choice discuss the good and bad points of each alternative for your company. Choose one alternative, cut it out of the sheet and set it aside. (Later you will organize these alternatives on newsprint.)

d. As you make your choices record their Cost, Time, and Risk on your TALLY SHEET (see instruction on TALLY SHEET).

5. After you have made all the choices for your company, part of your group should organize the alternatives selected. Arrange the alternatives by categories (boat and equipment, crew, supplies, etc.) and tape them onto a sheet of newsprint.

6. While some members of your company are organizing alternatives, the others should work on completing the TALLY SHEET. (see instructions on TALLY SHEET). When the TALLY SHEET is completed, attach it to your sheet of newsprint.

7. Display the sheet of newsprint containing your alternatives and TALLY SHEET on a classroom wall.
8. Get a copy of DAY-TO-DAY DILEMMAS IN FISHING from your teacher and complete the problems.

9. As a class, discuss the problems in DAY-TO-DAY DILEMMAS IN FISHING.

10. Fish Buyers will announce the contract winners and tell the class why they selected one Company over another.

11. As a class, review the activity.
TALLY SHEET

YOUR COMPANY NAME

Look at the Fishing Company choices. Select one person for each of the positions listed below. Record the Cost, Time and Risk factors on this sheet in the space provided.

<table>
<thead>
<tr>
<th>Fishing Crew</th>
<th>Cost</th>
<th>Time</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Setter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish Scaler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish Cleaner</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add up each column to get a subtotal for Cost, Time and Risk.

Select a boat. Follow the same procedure as above. Do the same for equipment, supplies and administration.

<table>
<thead>
<tr>
<th>Fishing Boat</th>
<th>Cost</th>
<th>Time</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat Maintenance and Repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harbor Fees</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Boat subtotal

<table>
<thead>
<tr>
<th>Fishing Equipment</th>
<th>Cost</th>
<th>Time</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scaler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice Maker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Recorder-Fishfinder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction Finder</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equipment Subtotal

163
<table>
<thead>
<tr>
<th>Fishing Supplies</th>
<th>COST</th>
<th>TIME</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel, Oil, Grease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packing Boxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administration</th>
<th>COST</th>
<th>TIME</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property &amp; Buildings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Association Dues-Periodicals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consulting Fee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Transfer the above subtotals for crew, boat, equipment, supplies, and administration into the spaces below. Then add up each column to give you the sum of subtotals for Cost, Time and Risk. You are now finished with the choices. Next you will have to calculate your insurance Cost from your Risk total. Then determine your financing Cost. The directions for doing this are given below.
<table>
<thead>
<tr>
<th>Operations Cost</th>
<th>COST</th>
<th>TIME</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crew Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration Subtotal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time and Risk Totals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Subtotal 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Cost*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see instructions below)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Subtotal 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing Cost or Interest**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for first year of loan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see instructions below)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your Fishing Company's Total Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Obtaining Insurance Cost

To get the insurance Cost for your Company multiply your Risk total obtained above by 1.7, (Risk total x 1.7 = Insurance Cost). Put the answer in the space provided above for insurance Cost. Then add Cost subtotal 1 plus your insurance Cost to get your Cost subtotal 2.
**Obtaining Financing Cost or Interest**

Few people have enough money of their own to start a business. They usually only have a small part of what they need and borrow the rest from a commercial bank. When you borrow money from a bank the bank will charge you for using its money. This is called financing cost or interest. How much the loan will cost depends on the amount you need to borrow, how long you want to borrow the money, and the interest rate.

For your small commercial fishing business, let us assume you have 20% of the Cost Subtotal 2 figure above. That means that you still need a loan for 80%. You will pay back the loan over 20 years. The interest rate is 10% per year. To calculate your financing Cost for the first year of your loan, multiply your loan amount by the interest rate (written as a decimal fraction). Put the answer in the space provided on the tally sheet. Now add your subtotal 2 and financing Cost together. This will give you the total Cost of your operation. You have already determined the Time and Risk totals. Post this completed tally sheet on your newprint below your choices.
FISHING COMPANY CHOICES

The following pages list the choices available for forming your fishing company. Choose one alternative from each section. Cut out the alternatives you select and put them aside until you are ready to organize them on newsprint.

Fishing Crew - These are the people who actually work in the boat out on the lake. They find the fish, set the nets, catch the fish and get the fish ready for market. You will need one captain, one net setter, one scaler and one cleaner-fillet cutter.

Fishing Captain - The fishing captain is the person in charge. She/he is responsible for the boat and crew. Captains take the boat from the harbor, find the fish, keep the boat steady while nets are being set or pulled and find their way back to the harbor.

********************************* cut out here *********************************

FISHING CAPTAIN

Tom Peabody: This man has just become a captain. He is young but has fished with his dad since he was a kid.

Cost: 15 Time: 6 Risk: 3

********************************* cut out here *********************************

FISHING CAPTAIN

Nels Anderson: Anderson has been on Lake Superior for 17 years. Before that he fished out of Lake Huron.

Cost: 25 Time: 2 Risk: 2

********************************* cut out here *********************************

FISHING CAPTAIN

Katie Winslow: Captain Winslow practically grew up on her father's fishing tug. Now that her kids are in school she wants to captain her own boat. She's been doing it off and on for six years already. Loves the work and knows the lakes.

Cost: 20 Time: 4 Risk: 1
Net Setter - This person takes care of the nets which are used for catching fish. He/she is responsible for setting nets and pulling them out with the help of other crew members.

**NET SETTER**

Peter Baker: Baker has never worked on a boat but knows how to take direction and learns fast. He is eager to become a good crew member.

Cost: 4  Time: 5  Risk: 2

NET SETTER

Booker Thompson: Thompson has worked on fishing boats before, but never on a trap setter. He has set other types of nets, and is a good worker.

Cost: 7  Time: 4  Risk: 3

NET SETTER

Frank Cataloni: Cataloni has worked on trap netters and has 9 years experience setting nets.

Cost: 10  Time: 2  Risk: 1
Fish Scaler - This person works with a special knife called a scaler or feeds fish into an automatic scaler which removes the scales from fish. Fish scales are very hard and difficult to cut so they are usually removed by scraping.

<table>
<thead>
<tr>
<th>FISH SCALER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ann Fleishman:</strong> Fleishman has never worked in fishing before but is a steady worker and learns fast.</td>
</tr>
<tr>
<td>Cost: 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FISH SCALER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ken Starr:</strong> Starr has worked as a scaler for a couple of years. However he is a slow worker.</td>
</tr>
<tr>
<td>Cost: 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FISH SCALER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rebecca Kern:</strong> Kern has 6 years scaling experience. She is dependable and very fast.</td>
</tr>
<tr>
<td>Cost: 9</td>
</tr>
</tbody>
</table>
Fish Cleaner - This person removes the head and guts of the fish and washes them to remove the blood. This is called dressing a fish. He/she may then cut the meat away from the bone to make fillets.

FISH CLEANER-FILLET CUTTER

Andrew Jackson: Jackson has some cleaning experience but is not very fast. He could probably do the job OK.

Cost: 6       Time: 3       Risk: 2

FISH CLEANER-FILLET CUTTER

Pat O'Leary: O'Leary has lots of experience but is not very careful. A lot of fish meat could be wasted.

Cost: 7       Time: 4       Risk: 1

FISH CLEANER-FILLET CUTTER

Rob Carter: Carter has a good deal of experience and he is careful and fast.

Cost: 11      Time: 2       Risk: 1

FISH CLEANER-FILLET CUTTER

Timothy Smithers: Smithers is your uncle. He's an old man who is a good worker, a bit slow, but very reliable. He tells good stories and is fun to have around.

Cost: 5       Time: 4       Risk: 2
Fishing Boat - This includes the things necessary to get you out on the Lake. You will need to select a reliable boat, some way of doing your maintenance and repairs, and a place to keep your boat. A boat is the most expensive thing you will have to buy for your company. You need a boat that can take the rough weather on the lakes. A bigger engine moves you faster but costs more to operate. New boats require less maintenance but are more expensive to buy.

---

BOAT - THE JOHN D

Forty feet long, steel hull, 175 HP diesel engine, 30 years old. Very lake-worthy. Present owner, Mr. Bill Johnson has used the boat for the last ten years. Johnson wants to sell the John D because he is going to retire. Says he's getting too old to be out on the lakes anymore. Mr. Johnson has taken real good care of his boat but it doesn't work as well as it used to.

Cost: 75  Time: 3  Risk: 3

---

BOAT - THE LESLIE L

Forty-two feet long, steel hull, 150 HP diesel engine, 25 years old. This boat has been sitting in the yards for a number of years and needs some minor repairs before it can go out on the lake. Once the repairs are done it will be an excellent boat. Cost includes repair.

Cost: 80  Time: 4  Risk: 2

---

BOAT - THE JAMMER

Forty-five feet long, steel hull, 75 HP diesel engine, 15 years old. This boat was once hit on the side by a lake freighter but has since been repaired. No structural damage was done, the boat is lake-worthy, reliable and well designed.

Cost: 85  Time: 5  Risk: 1
Boat Maintenance and Repair - Maintenance is the day-in and day-out things that you need to do to keep your boat running. This includes checking oil level in the engine and looking after deck equipment. You don't want your engine to be low on oil because that could damage it. You want to make sure equipment is tied down so you don't lose it during a storm. When things break down they need to be repaired. Otherwise your job gets impossible to do and it may even become unsafe.

BOAT MAINTENANCE AND REPAIRS

You do only the repairs that really have to be done. Often you wait until things break down before you do anything.

Cost: 4  Time: 3  Risk: 3

--------------------------------------------- cut out here ---------------------------------------------

BOAT MAINTENANCE AND REPAIRS

You do repairs and tune-ups regularly. That keeps your boat in good running order.

Cost: 6  Time: 1  Risk: 1

--------------------------------------------- cut out here ---------------------------------------------

BOAT MAINTENANCE AND REPAIRS

You do your own electrical repair and welding rather than hiring someone else to do it.

Cost: 1  Time: 5  Risk: 2

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Harbor Fees - You will need some place to keep your boat. Most fishers rent space at a harbor. The fees help maintain the harbor.

HARBOR FEES

You rent one of the best spots in the harbor. There is plenty of space for your boat; it is easy to get in and out.

Cost: 4  Time: 1  Risk: 1

HARBOR FEES

You rent a fair spot in the harbor. It's a small space, but a good captain shouldn't have any trouble getting in and out. There is a lot of traffic in the area so it's slow going.

Cost: 1  Time: 2  Risk: 2

HARBOR FEES

You build and maintain your own dock. Your Costs are maintenance and property taxes.

Cost: 3  Time: 2  Risk: 1
Fishing Equipment - Equipment includes items which are usually expensive to buy but last a long time. Most of the following items are necessary and make fishing easier and safer.

Fishing Nets - Various kinds of nets are used to catch fish. Different sizes and shapes catch different kinds of fish. Assume you are buying the correct kind of net for the fish you want to catch.

NETS

Mr. Johnson offers to sell you his nets. You can take advantage of this deal if you buy his boat. His nets are old but in good shape. Some repair will be necessary.

Cost: 2  Time: 3  Risk: 2

----------------------------------------------------------------------------------
cut out here----------------------------------------------------------------------------------

NETS

You can buy a new set of nets from the local dealer. They are made of nylon and are well designed.

Cost: 5  Time: 1  Risk: 1

----------------------------------------------------------------------------------
cut out here----------------------------------------------------------------------------------

NETS

You can buy a set of nets from a fisher who is going out of business. These are nylon nets and in good shape. A few repairs are necessary.

Cost: 3  Time: 2  Risk: 2

----------------------------------------------------------------------------------
**Winch** - This is a machine that lifts nets onto the boat. Nets can get very heavy when they are loaded down with fish.

---

**WINCH**

You can get an old hand-operated winch which is in good condition. Hand winches take longer to lift nets.

- **Cost:** 2
- **Time:** 4
- **Risk:** 1

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**WINCH**

You can get a gasoline powered winch. This requires a separate gasoline engine. This works fine, but can be dangerous because gasoline can leak and burn if there is a spark near it.

- **Cost:** 3
- **Time:** 2
- **Risk:** 3

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**WINCH**

You can get a winch that is driven off your boat's diesel engine. This means your boat engine has to be running when you are standing still, but using the winch.

- **Cost:** 4
- **Time:** 2
- **Risk:** 2
**Scaler** - A scaler is a tool which is used to scrape the scales off fish. The simplest is a specially designed knife used by a person. Automatic scalers are also available. Fish are fed in by a person.

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**SCALER**

You buy the basic knife style scaler which one of your crew members will use to scrape the scales from the fish.

Cost: 1  
Time: 3  
Risk: 1

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**SCALER**

You buy a used automatic scaler from a friend who is willing to give you a good deal.

Cost: 2  
Time: 1  
Risk: 2

---

**SCALER**

You buy a new top-of-the-line automatic scaler from your local dealer. The manager gives you a discount because you buy other equipment from him.

Cost: 4  
Time: 1  
Risk: 1

---
Ice Maker - A good supply of ice is needed on board the boat. Without ice the fish would begin to spoil rapidly, especially during warmer weather.

-------------- cut out here --------------

ICE MAKER

You buy your own ice making machine to supply your ice needs for packing the fish.

Cost: 3  Time: 1  Risk: 1

-------------- cut out here --------------

ICE MAKER

You cut blocks of ice during the winter from the lake. You store them and crush them later for your fish packing needs.

Cost: 1  Time: 3  Risk: 3

-------------- cut out here --------------

ICE MAKER

You get your ice from a local fish dealer who buys fish in the area. You can get as much as you need.

Cost: 4  Time: 2  Risk: 2
Radio - A radio is used to receive the latest weather bulletin, learn where other fishers have been able to catch fish, and speak with people on shore. If you should have an emergency while out on the lake, having a radio would allow you to call for help.

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**RADIO**

You decide not to buy a radio. If you take this alternative you will need to be a good weather forecaster. Getting caught out on the lake during a storm can be pretty rough.

Cost: 0  
Time: 3  
Risk: 3

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**RADIO**

You buy an older used radio which works OK but isn't too clear. Sometimes you have bad reception and cannot understand what is being said.

Cost: 2  
Time: 2  
Risk: 2

---

You buy a new top of the line model with fancy lights, dials, and switches.

Cost: 4  
Time: 1  
Risk: 1
Radar - The Lakes have a lot of large ship traffic on them. Some of the large boats weigh thousands of tons and can be a thousand feet long. During bad weather or when there is heavy fog you may not be able to see one of them until it is too close. Radar could save you from a collision. It can also help you to find the buoy attached to your nets on a foggy day.

RADAR

You buy a used radar system which has a range of 50 miles.

Cost: 4  Time: 1  Risk: 2

RADAR

You decide not to buy a radar system and instead take special care watching out for the big boats, especially during bad weather.

Cost: 0  Time: 3  Risk: 4

RADAR

You buy a new radar system with a range of 35 miles.

Cost: 5  Time: 2  Risk: 1
Depth Recorder - A depth recorder is used to determine where the bottom is, what it is made of, and what is its shape. It can also be used to locate schools of fish and sometimes one can identify the species as well. It works by sending sound waves through the water. When the sound waves hit an object, they bounce back and are detected by the recorder. This is called sonar.

DEPTH RECORDER

You decide not to buy a depth recorder.

Cost: 0    Time: 3    Risk: 3

DEPTH RECORDER

You buy a used depth recorder.

Cost: 3    Time: 2    Risk: 2

DEPTH RECORDER

You buy a new deluxe model depth recorder with the latest electronics.

Cost: 3    Time: 1    Risk: 1
Direction Finder - The simplest instrument is a compass. If you have a general idea of where you are, a compass works fine. To help boats navigate, radio beacons have been set up around the lakes to broadcast at specific frequencies. They are marked on nautical maps and may be picked up with a direction finder.

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DIRECTION FINDER

You buy a top quality magnetic compass.

Cost: 2
Time: 2
Risk: 1

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DIRECTION FINDER

You don't buy any direction finding equipment.

Cost: 0
Time: 4
Risk: 3

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DIRECTION FINDER

You buy an electronic direction finder that picks up the radio beacon signals.

Cost: 4
Time: 1
Risk: 1
Fishing Supplies - Supplies cost less to buy than equipment but do not last as long. They need to be replaced regularly.

Fuel, Oil, and Grease - Oil and grease are lubricants which cut down the friction between moving parts in the engine. This allows the engine to run at cooler temperatures. The fuel you need is called diesel and is made from petroleum just like gasoline. Diesel fuel is not as refined as gasoline.

FUEL, OIL, GREASE

If you bought M. Johnson's boat, the JOHN D, with a 175 HP diesel engine take this choice.

Cost: 4  
Time: 0  
Risk: 0

FUEL, OIL, GREASE

If you bought the LESLIE L, with a 150 HP diesel engine take this choice.

Cost: 6  
Time: 0  
Risk: 0

FUEL, OIL, GREASE

If you bought the JAMMER, with a 75 HP diesel engine take this choice.

Cost: 4  
Time: 0  
Risk: 0
Safety Equipment - Safety equipment is used during emergencies. It includes things like a first aid kit, fire extinguishers and flares. Flares give off a very bright light when they burn. They are used to let others know where you are.

SAFETY EQUIPMENT

You don't buy any safety equipment. This is probably against the law and is very dangerous.

Cost: 0  Time: 2  Risk: 3

Figure cut out here

SAFETY EQUIPMENT

You buy the standard safety equipment such as a first aid kit, fire extinguishers, and flares.

Cost: 2  Time: 1  Risk: 2

Figure cut out here

SAFETY EQUIPMENT

Besides the standard safety equipment you buy cold water survival suits for each crew member.

Cost: 3  Time: 1  Risk: 1
Packing Boxes - For easy handling the fish are packed in boxes of ice.

PACKING BOXES
You use your dad's old wooden crates. You are used to them and they do not cost you any money. However, about 10% of your fish go bad before they reach wholesale buyers.

Cost: 0          Time: 2          Risk: 2

PACKING BOXES
You buy new cardboard boxes that are thrown away after they have been used. They cost more money but fish stay fresher longer.

Cost: 2          Time: 1          Risk: 1

Cleaning Supplies - Unless the work area where fish are dressed is kept clean, bacteria can grow and contaminate the fish. After all the fish are dressed each day, the work area is completely cleaned.

CLEANING SUPPLIES
You buy standard cleaning supplies and keep your work area clean.

Cost: 1          Time: 1          Risk: 1

CLEANING SUPPLIES
You buy no cleaning supplies. You take the chance of being declared unsanitary by the Health Department and being fined.

Cost: 0          Time: 2          Risk: 2
Administration - Administration is all those things which are necessary to keep the company running but are not directly tied to catching the fish. This includes letter writing and bookkeeping.

Secretary - Secretaries do things like taking dictation, type letters, and file correspondence. They also may take care of renewing licenses and paying bills.

SECURITY

You decide to do all your own letter writing and filing during your off hours.

Cost: 0  Time: 2  Risk: 1

Secretary

You hire a friend of yours who is a high school graduate, knows shorthand and is a good typist. This is a part-time position for about 20 hours a week.

Cost: 5  Time: 0  Risk: 1

Accountant - An accountant keeps your books in order. Your books are where you keep track of all the money you are spending and all the money you are making. Accountants also fill out tax forms. The Internal Revenue Service requires the books to be exact.

ACCOUNTANT

You get a professional accountant to come in every few months to check your books and file your income tax returns.

Cost: 3  Time: 0  Risk: 1

ACCOUNTANT

A member of your family spends a few hours each week taking care of your books. A few mistakes are made, but nothing serious. You wonder if you should pay your relative for this work, but he/she has never complained.

Cost: 0  Time: 1  Risk: 2
Property and Buildings - Fishers usually own or rent property with buildings on it. Sheds are used to store and repair equipment. Some fishers also have a store where they sell some of the fish they catch.

PROPERTY AND BUILDINGS

You rent your property and buildings. You pay your landlord a monthly amount for use of the land and structures. It is the landlord's responsibility to maintain the buildings and property.

Cost: 12
Time: 0
Risk: 2

PROPERTY AND BUILDINGS

You buy the land and buildings you need. You are responsible for maintenance of the land and buildings. You pay the bank a monthly mortgage amount which includes taxes on the property.

Cost: 7
Time: 4
Risk: 3

Dues, Magazines and Newspapers - Just about every trade and profession has an organization which represents its members' concerns to the government. Such organizations try to improve and change the laws for the benefit of its members. Numerous magazines and newspapers are also available to keep individuals informed of the latest developments in their field as well as the current news.

DUES, MAGAZINES AND NEWSPAPERS

You join the fishers' organizations. You attend meetings, read the latest fishing news and try to be well-informed.

Cost: 2
Time: 2
Risk: 1

DUES, MAGAZINES AND NEWSPAPERS

You don't really care about politics and you don't trust the new techniques that everyone talks about. You just like to fish and wish people would leave you alone to do your job.

Cost: 0
Time: 0
Risk: 2
Transportation - The dressed fish are usually transported in a refrigerated truck. The truck driver is responsible for the fish and it is his/her job to get them to the buyer as quickly as possible.

TRANSPORTATION

Roosevelt Andrews is a responsible driver with plenty of experience. He has a well-maintained refrigeration unit on his truck. He's had no accidents.

Cost: 8  Time: 3  Risk: 1

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TRANSPORTATION

Chang Lee is a good driver but his truck and its refrigeration system are in bad shape. He has a no-accident record.

Cost: 6  Time: 5  Risk: 3

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TRANSPORTATION

Ken Smith: Smith is your 19-year-old son. He likes driving but frankly, he's not as reliable as you'd like him to be. He's had a couple of "fender-benders".

Cost: 3  Time: 8  Risk: 2
FISH BUYER INSTRUCTIONS AND ROLE DESCRIPTIONS

Your have been asked to play the role of a Fish Buyer in the COMMERCIAL FISHING: JOBS AND PROFESSIONS activity. Your job as a Fish Buyer is to select the commercial fishing company which can best supply your business needs. You will have to choose from among several companies being established by the students.

The classroom teacher will assign you to one of three roles:

1. Buyer For Fish Fertilizer Plant
2. Fish Processor Buyer
3. Restaurant Chain Buyer

Carefully read the instructions which follow and your assigned role description.

Instructions For Fish Buyers

1. Read the Fish Buyer Role Description assigned to you by the teacher.
2. When instructed by the teacher, explain to the class your type of business and what kind of fish you are looking for. Refer to your role description if necessary.
3. While the students are organizing their commercial fishing companies, walk around and visit, quietly noting what is going on. If they have any questions about the kind of deal you are looking for, answer them.
4. When a student group has completed forming their company they will post a sheet of newsprint. This sheet of newsprint will display the alternatives they selected and their completed TALLY SHEET. The TALLY SHEET is like a company ledger.

Carefully study each company's alternatives and TALLY SHEET as they are posted. The postings will contain the information you need to determine which company should receive your contract.
The Cost, Time, and Risk totals on the last page of a company’s TALLY SHEET will help you make comparisons among the companies. The Cost number tells you how much the company will charge for their fish. The higher the number the more you will have to pay for the fish. The Time number tells you how long it will take the company to deliver fish. The higher the number the longer it will take you to get your fish. The Risk number tells you the likelihood of getting the fish you order. The higher the Risk number the greater the chance that something will go wrong. A low Risk number tells you the company is reliable and dependable.

5. Based on the alternatives the company selected, their total Cost, Time, and Risk, and your needs (refer to your role description), decide which company will receive your contract.

6. When the classroom teacher asks you, be ready to tell the class which company is receiving your contract and the reasons behind your decision.
ROLE DESCRIPTIONS

BUYER FOR FISH FERTILIZER PLANT

You are the fish buyer for Eazy-Gro Fish Emulsion, Inc., a company that makes a liquid fertilizer from fish. The fish are ground up, fermented, sterilized and sold in bottles. This smelly soup makes great fertilizer for houseplants.

Your company buys low quality fish in big quantities. Alewives are good, since they have lots of bones (good for fertilizer) and nobody wants to buy them for food. Thus, they are cheap. You don't care if the fish you buy are sanitary or not. What you want are lots of them, and regularly supplied.

Rapid delivery doesn't matter either...if the fish spoil a bit on the way, no harm done. Naturally, you don't need to have them scaled or cleaned. In fact, the scales and guts are good for the fertilizer.

Most of the year, alewives live far from shore. Thus your supplier will probably need a powerful, well-equipped boat with good navigating equipment.

You want your fish in quantity, reliable and cheap.

FISH PROCESSOR BUYER

You represent the buyer for Savory Seafoods Fish Products, Inc. Your company makes a variety of frozen fish products like fish sticks and frozen fillets, and canned fish chowders. Your biggest customers are fast food restaurants and supermarkets.

You want to buy large quantities of high quality fish to ensure a popular product. Any firm, white-fleshed fish will do, since buyers of your products can't really tell the difference between types of fish.

The fish you buy must be delivered rapidly and stored under careful sanitary conditions. This means the fish must be well-iced and stored in clean boxes. You will pay top dollar for fish that are well-cleaned and scaled.
You want to buy fish all year 'round. This probably means that the fishing company you deal with will need a boat capable of fishing nearshore and offshore.

Naturally, you want to get fish as cheaply as possible. However, you realize that you may have to pay extra to get a reliable, sanitary supply.

RESTAURANT CHAIN BUYER

You represent the buyer for Snug Harbor Inns, a chain of high quality seafood restaurants around your state. One speciality of the Inns is broiled lake perch. Getting year-round reliable supplies of perch is difficult. You are searching for a fishing company who can bring you lake perch on a regular basis.

The fish you buy must be delivered rapidly, and stored under careful sanitary conditions. This means the fish must be well-iced and stored in clean boxes. You will pay top dollar for fish that are well-cleaned and scaled. Your customers are pretty choosy, and can taste the slightest stale flavors.

Since perch live nearshore most of the year, your supplier probably doesn't need a boat powerful enough to travel many miles offshore. Neither will the supplier need fancy navigating equipment. They must be reliable and have a very good sanitation record.

You hope to get a cheap supply of perch. However, the sanitation and fast delivery may cost a bit more.
DAY-TO-DAY DILEMMAS IN FISHING

Below is a list of problems that you might come up against during your fishing career. Put the name and profession of the person who best might help you solve your problem on the line below each problem. The descriptions can be found on the following pages. The person's name, profession and educational background are given to help you match the right person to the problem.

PROBLEM

You have noticed that some of the fish you are bringing up act a little strange. They seem to die quickly, and don't move like the other fish. Is this a disease? Could it be a problem that will get worse? Or is something poisoning the fish?
Problem Solver's Name & Profession

PROBLEM

Your state's Department of Natural Resources is going to make a rule that limits the number of whitefish you are allowed to catch. They say that the population of whitefish is going down. You disagree because you have seen no change in your catches, and other fishers in your area agree. A scientist at the university supports your argument. How do you argue with the Department?
Problem Solver's Name & Profession

PROBLEM

Before you can sell your fish you have to have a sample of your catch tested for levels of toxic chemicals. You would like to speak to someone who could explain the tests and what they mean.
Problem Solver's Name & Profession

PROBLEM

There are both smelt and whitefish in your fishing grounds right now. You have fishing gear to catch both. Which one would bring you the most money right now? Where are people getting the most money for these fish?
Problem Solver's Name & Profession
PROBLEM

The channel where you dock your boat is getting filled with mud. You need to dig out the mud. That means you will have to hire a dredging company to do the work. However, there are a whole lot of rules about any kind of construction in Great Lakes waters. You need someone to tell you what forms to fill out and how to get permission to go ahead with the project.

Problem Solver's Name & Profession

Problem Solvers:

LOYBYIST

Bob Inglehart is the president of your state's commercial fishers organization. He fishes, but spends a lot of time talking to state legislators and to the people in the state's Department of Natural Resources. He has a college degree in physical education. He often argues with the department when fishers disagree with them about rules and regulations. Sometimes Inglehart wins the fight, sometimes he loses. But he's a good talker and knows who to talk to.

MARKET ANALYST

Tony Rodriguez is a market analyst. He works for the National Marine Fisheries Service in Chicago. He prints weekly prices of what various kinds of fish are selling for in the big markets in Chicago, Detroit, Cleveland and Buffalo. He has a Master's Degree in Business Administration.

ENGINEER

Tina Revere is an engineer with the U.S. Army Corps of Engineers. She reads applications for construction in Great Lakes waters and decides whether they should be approved. She works in close cooperation with the state's Department of Natural Resources because they have to approve these projects too. She knows all the paper work that has to be done and often can give good advice about how to do the project. She has a Bachelor's Degree in Hydraulic Engineering.
PUBLIC INFORMATION SPECIALIST
Sami Sharraf is a writer who works for your state’s Department of Natural Resources. The Department knows that much of its technical information is hard for ordinary people to understand. Sami takes the information and writes it into pamphlets and articles that are easy to understand. Lately he has written stories that explain how pollutants affect people’s health. He is a good person to contact when you are looking for information. He got his journalism training in the army where he edited a newspaper for the troops.

FISH BIOLOGIST
Martha Tallchief is a fish biologist with the U.S. Fish and Wildlife Service. She went to college and received a Bachelor of Science degree in biology and then attended Graduate School to study fish biology. She keeps track of fish diseases and poison problems in your area.

BIOCHEMIST
Irene Bessaris is a biochemist. She got her undergraduate degree in biology and chemistry, and then went to graduate school for a masters degree in the same field. She studies the chemical processes of living organisms.
LAKE TROUT FISHING AND GREAT LAKES ECONOMY

1. SCENARIO masters
   a. CAMPERS/BOAT RENTERS
   b. HOTEL/CHARTER BOAT USERS
   c. RECREATIONAL VEHICLE/BOAT OWNERS

2. STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP master

3. PLANNING A SPORTFISHING TRIP WORKSHEET master
LAKE TROUT FISHING
AND THE GREAT LAKES ECONOMY

To The Teacher

The disappearance of the lake trout brought sharply into focus the extent to which that fish is valued by people around the Great Lakes and beyond. Among the first to experience the economic pinch of its loss were the people in the commercial fishing industry of the Upper Great Lakes and their customers. The decline of the lake trout population also caused serious difficulty for the sport fishing industry, which was just beginning to boom in the 1950s. Commercial fishermen were, for a time, able to make up for the loss of the lake trout in their catches by catching other species of fish like chubs and whitefish. This was possible only for a short time as the chub and whitefish populations also went into decline. Few species however were as sought after by customers as the lake trout. As a result, the commercial fishing industry generally declined, although it continues on all of the Great Lakes at a reduced level.

Sportfishers also found it necessary to devote their skill and efforts to new quarry. Most, however, still prized the lake trout and urged public officials to establish programs to rehabilitate trout populations. This pressure intensified in the 1950s when large numbers of people began to have more disposable income and leisure time. Sport fishing became one of the most popular recreational pursuits in the Midwest. State, federal, and provincial governments responded to the new demands for recreational opportunities and ample trout stocks by spending heavily in lake trout research and hatchery/planting programs in order to re-create a large trout population in the Great Lakes. During the 1960s other species of sport fish, such as salmon, were also planted in the Great Lakes.

Unfortunately, only in Lake Superior are lake trout breeding naturally. The presence of a lake trout population in Lakes Michigan, Huron, Erie, and Ontario is thus dependent upon hatcheries. Recently there have been some indications of natural reproduction in Lake Huron.

A multimillion dollar industry has developed around sportfishing. Tourism, for example, is the second largest industry in Michigan, and much of this industry is the result of visitors to the state's shoreline to catch lake trout and other game fishes found in the Great Lakes. Sport fishing is estimated to yield $250,000,000 for Michigan each year. Another indication of fishing's importance is the size of the region's recreational boating market. Over one quarter of all U.S. recreational boat sales are made in the Great Lakes states. Many of these boats are used for fishing. Recreational fishing makes substantial contributions to the economies of all the states in the region and Ontario.

The cost of controlling the sea lamprey has been rising steadily. The cost of restocking the lakes with new lake trout has been following the same trend. To take another example from Michigan, officials there estimate that every adult lake trout costs taxpayers six dollars to produce (1979). Millions of lake trout yearlings are annually planted in the Great Lakes by federal and state agencies. Other states plant large numbers of lake trout as well.

The value of the commercial fishery varies greatly from one state or province to another. The trend however, is for commercial fishing revenues to be greatly overshadowed by those derived from sport fishing.
The activity, The Sea Lamprey’s Challenge to the Great Lakes Trout Fishery, demonstrated some of the economic and social costs associated with the sea lamprey’s entry into the upper Great Lakes. Students also found out about the efforts being made by the United States and Canada to control the sea lamprey and to replace the valuable fish resources that have been lost. This activity is designed to follow up on this with a more detailed investigation of just how much a lake trout costs the consumer and benefits the recreational consumer. It focuses on the significance of sportfishing to the economy and society of the Great Lakes region. Finally, the activity will provide students with an opportunity to calculate and compare the relative costs and benefits of lake trout for a sportfisher and a commercial fisher.

**Objectives**

1. The students will be able to name at least six jobs that result directly or indirectly from sportfishing. (Examples: hotel and restaurant owners and employees, tackle shop personnel, equipment manufacturers, distributors and retailers, etc.)

2. The students will be able to name at least six jobs that depend directly or indirectly on commercial fishing. (Examples: fishermen, boatbuilders, retailers, packagers, transporters, restaurant personnel, etc.)

3. The students will be able to plan and organize a sportfishing trip and to draw up a budget of the trip’s costs.

4. The students will be able to identify and discuss the relative benefits to themselves and society of catching a lake trout on a sport fishing trip and of buying lake trout in the market. The students will be able to suggest reasons why many people prefer to catch their own lake trout, although it would be cheaper to buy it in a market (benefits of outdoor recreation, aesthetic enjoyment, exercise of skills, enjoyment of travel, jobs, etc.)

**Materials Provided**

1. Three scenario masters:
   a. #1--CAMPERS/BOAT RENTERS
   b. #2--HOTEL/CHARTER BOAT USERS
   c. #3--RECREATIONAL VEHICLE/BOAT OWNERS

2. One STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP master.

3. One PLANNING A SPORTFISHING TRIP WORKSHEET master.

**Materials Required From Local Sources**

1. Masking Tape
2. Newsprint (at least 25 sheets)
3. Felt-tipped pens (at least 5)
4. A Map of the Great Lakes Region

5. One copy of the appropriate scenario for each member of the three groups formed to plan a sportfishing trip according to the three scenarios listed above.

6. One copy of the STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP and the PLANNING A SPORTFISHING TRIP WORKSHEET for each student.

Procedure

1. Begin by telling the students that the activity will require them to plan and budget for a fishing trip to one of the Great Lakes. The goal of their trip will be to catch lake trout. Hence, they will begin the activity by selecting a suitable site.

2. Ask the class to choose one of the following fishing resorts for the fishing trip. Everyone in the class should plan their fishing trip for this same site.

   a. LAKE SUPERIOR
      1. Knife River, Minnesota
      2. Bayfield, Wisconsin

   b. LAKE MICHIGAN
      1. Baileys Harbor, Wisconsin
      2. Sheboygan, Wisconsin
      3. Leland, Michigan

   c. LAKE HURON
      1. Alpena, Michigan
      2. Harbor Beach, Michigan

   d. LAKE ERIE
      1. Buffalo, New York

   e. LAKE ONTARIO
      1. Rochester, New York
      2. Toronto, Ontario, Canada*

*NOTE: Only one Canadian location is listed because in Canada, charter boats operate only in the Toronto area of Lake Ontario. No Ohio sites are listed because lake trout are caught only from the extreme eastern end of Lake Erie, which is under the jurisdiction of the State of New York.
3. Ask the students to locate on a map the resort they have chosen. Then ask them to calculate the distance between their school and the resort.

The total distance figure will be used later in the activity when the students calculate the cost of travel for their trip.

4. Explain to the class that while all of them will be planning a fishing trip for the same resort, they will be planning for three different types of vacations. Some of them will be asked to assume that they are CAMPERS/BOAT RENTERS, others that they are HOTEL/CHARTER BOAT USERS, and others that they are RECREATIONAL VEHICLE/BOAT OWNERS.

5. Divide the class into three equal groups. Place each group near a wall space large enough to permit the posting of the four sheets of newsprint that will be used in the course of this activity.

Give each group five sheets of newsprint, some masking tape and a felt-tipped marker.

6. Ask each group to choose, or assign to each group one of the scenarios:

   a. CAMPERS/BOAT RENTERS
   b. HOTEL/CHARTER BOAT USERS
   c. RECREATIONAL VEHICLE/BOAT OWNERS

7. Distribute to each group member one copy of the STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP, one copy of the PLANNING A SPORTFISHING TRIP WORKSHEET and one copy of the appropriate scenario.

8. Ask the students to read the STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP and the SCENARIO. Assist them with any questions they may have. Ask them to proceed as instructed on their SCENARIOS.

9. Ask each group to make a list on another sheet of newsprint of all the jobs they can think of that depend in some way on the production of the goods and services they will need for their sportfishing trip. Have the recorder write down this list on the sheet of newsprint just posted. If the group members desire they might construct a diagram which would illustrate--by drawing lines between jobs, how various jobs they have suggested are interrelated.

When the students attempt to inventory all the jobs created by the manufacture, sale and service of all the equipment and facilities they "used" during their weekend trip, their lists will rapidly become very long. You may, therefore, wish to set a limit to this part of the activity (10-15 minutes).

Retain this list for future reference.
10. On the remaining sheet of newsprint, ask the students to list all the jobs that they can think of which are generated by the commercial fishing industry.

Generally, commercial fishing provides employment for a captain and crew for each fishing vessel, fish processors, truckers, wholesalers, and retail outlet fish handlers. This will probably be a much shorter list than the students will have worked out for the previous question.

11. Ask the students to compare the commercial fishing list with the list of jobs generated by sportfishing.

12. Ask the students to discuss:

   a. How the difference between the lists could explain the difference in cost between fish caught by a commercial fisher and fish caught by a sportfisher.

   b. How it is possible that a small number of commercial fishers can produce large quantities of fish more cheaply than a large number of sport fishers. Why do commercial fishers still have a much smaller overall impact on the economy of the Great Lakes region?

   c. Whether the difference in the number of jobs generated by these two ways of catching fish means that commercial fishing should be discouraged or abandoned by Great Lakes resources managers? What reasons support a continuation of commercial fishing?

Arguments in support of the maintenance of the commercial fishery hold that it supplies high quality protein to people who do not or cannot fish for sport. Commercial fishing is also an important tool in fish management: populations of fish are kept in ecological balance by both commercial and sport fishing. Another reason for commercial fishing is that some fish species cannot be caught using sport fishing methods.

On the other hand, some people may argue that commercial fishing should be abandoned because it contributes relatively small amounts to the economy. They may also point out that protein is available from land sources and the ocean. Some also point out that sport fishing constitutes a much larger interest group, politically, than commercial fishing (if you do not include commercial fish consumers).
STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP

Introduction

In the 1940s and 1950s, the lake trout population declined to the point where it almost disappeared from the Great Lakes. Commercial fishers who depended upon trout for much of their income suffered a serious economic loss.

Sportfishers were also affected by the decline of the lake trout population. When there seemed to be no more lake trout, they went less often to their favorite lake trout fishing resorts on the Great Lakes. As a result, many of the business people who made their living from the lake trout sportfishing industry (restaurants, lodging, tackle, boat rentals, etc.) found their incomes reduced too.

People turned to their state and federal governments to help them solve the problem of the disappearance of the lake trout. The governments took action by setting up and maintaining a sea lamprey control program, since the sea lamprey threatened human use of the lake trout. In addition, they decided to spend more money for the study of the Great Lakes fisheries and the restocking of these lakes with lake trout. They also began stocking other kinds of fish--like salmon--that are attractive to sportfishers. As a result, the sportfishing industry has revived and grown to be worth over a billion dollars each year in the Great Lakes region. Large numbers of people--many more than when the sea lamprey first made its appearance in the Upper Great Lakes--now depend upon the sportfishing industry for their living.

In this activity you will plan a fishing trip to a Great Lakes resort. You will discover how your sportfishing trip benefits many others besides yourself.

Procedure

1. Read the STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP and the SCENARIO which you have just received.
Read over your SCENARIO several times in order to make sure that you know how to proceed with the rest of this activity. Ask your teacher to assist you if there is anything on these sheets which you do not understand.

2. Read over your PLANNING A SPORTFISHING TRIP WORKSHEET. You received it with the SCENARIO and STUDENT GUIDELINES FOR PLANNING A SPORTFISHING TRIP.

This worksheet is a guide to help you organize your data. Keep it for future reference. The guide includes: 1) a list of goods and services that you and your group select for your fishing trip (services are things that you will have to pay other people to do for you on your trip, such as boat rental, charter boat services, etc.), and 2) an account of the cost of these items.

Some items are unavoidable basics such as lodging, food, tackle and transportation. These "essentials" can be chosen in such a way as to minimize costs without lessening the likelihood of catching a lake trout. Your group should work to reach an agreement on which goods and services you think are "necessary" and how you can get the best value for your money.

The "optional" category on the worksheets is for extra items and services that you and your group might like to have for your fishing weekend. These items would make your trip more convenient or comfortable.

3. Elect one member of your group to be the recorder. This person will be in charge of writing down all of the goods and services that your group decides it will need and/or want for its fishing trip. Write on the newsprint which has been distributed to your group. The recorder should first of all put up three sheets of the newsprint on the wall near your group. The other two sheets of newsprint should be put aside for use later on in this activity. The recorder should label the three sheets (with a felt-tipped marker as follows: sheet #1, MATERIALS NEEDED; sheet #2, SERVICES NEEDED; sheet #3, OPTIONAL ITEMS AND SERVICES. The lists should be constructed to leave space for writing in the price of each item selected by your group.
4. Together with the other members of your group make a list for 1) the goods (equipment, clothing, boat, etc.), 2) services (hotel, restaurant, boat rental, etc.) and 3) optional items (things which you do not think are necessary, but which you would like to have) that you will need for the fishing trip described in your SCENARIO.

After your group agrees on these things, write them down on your own PLANNING A SPORTFISHING TRIP WORKSHEET and have your recorder write them down on the large sheets of newsprint.

5. When your group has put down (on your worksheets and the newsprint) all of the things that you think you will need for your fishing trip, your next task will be to find out how much each of these things will cost.

Divide the listed items evenly among yourselves so that each of you will be responsible for finding the costs of only part of your group's lists.

Some of this information may be easy to find and not take much of your time at all. Some of it, though, may be harder to find and will require more of your time and effort. Consult with your teacher on how to schedule your work if it seems that it will take a long time. Some suggestions on where to look for information on the costs of fishing trip are given below.

A NOTE ON WHERE TO LOOK FOR INFORMATION ON THE COSTS OF YOUR FISHING TRIP: Information on clothing, equipment, vehicles, etc. should be available from local merchants. Information on the cost and availability of hotel and motel space can be found in the current issue of the American Hotel and Motel Association Directory, Inc.'s Hotel & Motel Redbook, which should be available at a local hotel, motel, or in the public library. You may also write or telephone the travel bureau or tourist association in the state or province where the resort you have selected is located. (The Ontario Tourism Ministry will respond only to inquiries made by teachers. Therefore, if you need information on Ontario, ask your teacher to write away for it.) These sources, state departments of natural resources, and state and federal fish and wildlife services will also have information available on license fees, the cost of parking, launching and docking, etc. Your local or school library
will have magazines and newspapers with articles on sportfishing, recreation and accommodations around the Great Lakes.

Several other sources of information for the Great Lakes region are:

U.S. National Park Service Northeast Region
(for Pennsylvania and New York)
143 S. Third Street
Philadelphia, Pennsylvania 19106

U.S. National Park Service Midwest Region
(for Lakes Michigan, Erie, Huron and Superior)
1709 Jackson Street
Omaha, Nebraska 68102

Ontario Travel
Ministry of Industry and Tourism
900 Bay Street
Toronto, Ontario M7A 2E5
Canada Tel: 416-965-4008 (collect)

6. Record the cost of each item on your worksheet as you and the other members of the group find out what it is. Be sure to record the costs of all the items you have listed, not just the ones that you have found out the price of yourself. Your group's recorder should write in the cost of each item beside the name of the item on the newsprint lists.

7. When your group has found out the cost of all the items on your list(s), add up all these expenses.

Record this sum at the bottom of your worksheet and have your group's recorder write it down at the bottom of your newsprint list(s).
8. Refer back to your SCENARIO and find out how many pounds of lake trout you will catch on your trip. Divide the total amount of your expenses by the number of pounds of lake trout allowed to you in your SCENARIO to find out the price per pound of the lake trout you will catch.

9. Call or visit your local supermarket or fish market. Find out how much a pound of frozen or fresh trout costs.

NOTE: If you do not find lake trout in your market, use the price per pound of whitefish or walleye instead. This price may not be exactly comparable to the lake trout, but it will probably be close.

10. Compare the costs of lake trout (or comparable fish) available in the market with the cost per pound of the lake trout you will catch on your fishing trip.

11. Compare the costs of your group’s fishing trip with those of the other groups in the class and discuss with the other members of the class why you do or do not feel that the trip you helped plan would be worth what you would have to pay for it.

12. Discuss as a whole class the following questions:

   a. Would you prefer or not prefer to pay the price of the lake trout you caught yourself or to buy the trout at the market? Why?

   b. What are the benefits to you, and society as a whole, of paying the higher price for the lake trout you caught?

   c. What are the benefits to you, and society as a whole, of paying the price of the lake trout available in the market?
CAMPERS/BOAT RENTERS

You are a family of four planning to go on a sportfishing trip. You are going to a Great Lakes campground where you will spend the weekend. You will camp there in a tent, and will rent a fishing boat for two days. You own your own fishing tackle. You will catch enough lake trout to weigh five pounds when cleaned. Now you want to figure out how much this trip will cost. Include one tenth of the costs of your tent, sleeping bags and other camping equipment. Also add one third of the costs of your fishing tackle. Include the costs of all materials you will need and optional items (things you'd like to have but don't necessarily need). Remember to include costs of transportation, lodging and eating and fishing. Estimate your costs for boat rental at $35.00 per day (including gas).
SCENARIO #2

HOTEL/CHARTER BOAT USERS

You are a family of four planning to go on a sportfishing trip. You are going to a Great Lakes fishing resort where you will spend a weekend. You will stay in a nearby hotel or motel and rent the services of a charter boat for two days. You will catch ten pounds of lake trout, dressed.

Now you want to figure out how much this trip will cost. Include the costs of materials you need, services you need and optional things (items or services you'd like but don't necessarily need). Include all costs of transportation, lodging, eating and fishing. Estimate your charterboat costs at $50.00 per person per day.
RECREATIONAL VEHICLE (RV)/BOAT OWNERS

You are a family of four planning to go on a sportfishing trip. You are going to a Great Lakes fishing spot where you will spend the weekend. You will sleep in your Recreational Vehicle (RV) and use your own boat. You will catch five pounds of lake trout, dressed.

Now you want to figure out how much this trip will cost. Include the costs of materials you need, services you need, and optional things (items or services you'd like but don't necessarily need).

Include in the costs one-tenth of the cost of your recreational vehicle and boat. Also add one third of the cost of your fishing tackle. Include all other costs of transportation, lodging, eating, and fishing.
PLANNING A SPORTFISHING TRIP WORKSHEET

<table>
<thead>
<tr>
<th>Materials Needed</th>
<th>Services Needed</th>
<th>Optional Goods &amp; Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Cost</td>
<td>Item</td>
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