

APPENDIX C

Game Materials for both Game Kit and Online Versions of Fish Banks

Steps of Play for both Game Kit and Online Versions of Fish Banks

Table of Contents

Game Kit

MIT Learning Edge Online Simulation

Creative Learning Exchange – 5th-12th Grade Summary

Fish Banks Resource Credits:

LaVigne, Anne. (2015). FishBanks Lesson Guide and Handouts for 5th-12th grade audience. Creative Learning Exchange, <http://static.clexchange.org/ftp/newsletter/CLEx24.2.pdf>

FishBanks, Ltd. game originally developed by Dennis Meadows, Emeritus Professor of Systems Management, University of New Hampshire.

Web version developed by Professor John Sterman (MIT Sloan School of Management), with help from Prof. Andrew King (Tuck School of Business), Dennis Meadows, Keith Eubanks, and Forio.com. Available from <https://mitsloan.mit.edu/LearningEdge/simulations/fishbanks/Pages/fish-banks.aspx>

Game Kit screen shots from System Dynamics Society.

Simulation screen shots from web version of FishBanks.

Game Materials for both Game Kit and Online Versions of Fish Banks

Materials	Fish Banks, Ltd. – System Dynamics Society, (Dennis Meadows and Tom Fiddaman)	MIT Sloan School of Business, (John Sterman and Andrew King)
Material Source	<i>Game Kit materials</i> – Purchase from System Dynamics Society , http://www.systemdynamics.org/products/fish-bank/ ; or borrow materials from NOAA	Register online at MIT LearningEdge https://mitsloan.mit.edu/LearningEdge/simulations/fishbanks/Pages/fishbanks.aspx
Game Materials	<ul style="list-style-type: none"> • A computer is required for the instructor. • Fish Banks Game Board (Great Bay, New Hampshire) • 85 Wooden Boats • FishBanks Version 8.0 CD – Game Software and Electronic Files <ul style="list-style-type: none"> ○ Introductory Video by Dennis Meadows (Mac or Windows format, ~10:00 min) ○ various data files ○ (2) PowerPoint slide sets – one for introducing the game (an alternative to the above video) and one for debriefing the game ○ 48 page e-manual for download. The e-manual contains <i>extensive</i> information on setting up, introducing, conducting, and debriefing the game plus detailed instructions for operating the computer program. <p>Optional: Create your own Chesapeake Bay Game Board</p> <p><i>Change the fishing locations from Deep Sea and Coastal areas to Coastal and, and use Delaware Bay as your Harbor. On the Decision Sheet, you will have to change the</i></p>	<p>Teacher Note: Once you are registered, you can access all of the Fish Banks Materials listed below, starting with the Student Instructional Video:</p> <ul style="list-style-type: none"> • Computers for each team of 2-4 students; computer for instructor <p>Student Instructional Video (36:10 min.)</p> <p>Fish Banks Simulation Teaching Video (1 hr. 13:25 min.)</p> <p>Introductory presentation – Slide Presentation format (19 slides) with audio by Dr. John Sterman, who developed the simulation for online play. The presentation includes information about the following:</p> <ul style="list-style-type: none"> • Team Roles • Team Goals • Financial Information, including income and costs • Fishing Fleet • Catch and Ship Effectiveness; effects of weather • Fishing Areas • Fish • Regeneration

Game Materials

Deep Sea to Chesapeake Bay/ Tributaries; just be careful transcribing the numbers. Or you could create a new Decision Sheet that reflects the changes.

Introductory presentation –

Video format (13:22 min.) with audio by Dr. Dennis Meadows, who is the original Fish Banks, Ltd simulation developer. The presentation includes information about the following:

- Team Roles
- Team Goals
- Financial Information, including income and costs
- Fishing Fleet
- Catch and Ship Effectiveness; effects of weather
- Fishing Areas
- Fish
- Regeneration

Debriefing Presentation – video format; Dr. Dennis Meadows

Teacher Note: There will be specific Chesapeake Bay-related fisheries slides that you can incorporate into the debriefing to use for student discussion and evaluation. These are included in **APPENDIX D**.

NOTE: There are debriefing presentations for both versions of the game.

Fish Banks Simulation Guide – 5th-12th Grades (20) pages

- One **computer** for every 2-4 students
- **Simulation online at** [http://bit.ly/Fish Banks](http://bit.ly/FishBanks)
- **Handouts** (Pages 8-15) Excel **spreadsheet** to create Users/ Fishing Teams
- **Introduction and Debrief slideshows**
- **Technical Guide** (starting on page 17)

Debriefing Slides

42 slides – Within the Instructors' Debriefing Guide, each slide is present with key points to describe the slide.

Debriefing Presentation – video format; Dr. John Sterman

Teacher Note: There will be specific Chesapeake Bay-related fisheries slides that you can incorporate into the debriefing to use for student discussion and evaluation. These are included in **APPENDIX D**.

Steps of Play for both Game Kit and Online Versions of Fish Banks

<p>Steps of Play</p>	<p>FishBanks, Ltd. – System Dynamics Society, (Dennis Meadows)</p>	<p>MIT Sloan School of Business, (John Sterman and Andrew King)</p>
<p>Material Source</p>	<p>Game Kit materials – Purchase from System Dynamics Society, http://www.systemdynamics.org/products/fish-bank/; or borrow materials from NOAA.</p>	<p>Register online at, Online Resources – MIT LearningEdge https://mitsloan.mit.edu/LearningEdge/simulations/fishbanks/Pages/fish-banks.aspx</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Steps of Play</p>	<p>Introductory Briefing Presentation</p> <ul style="list-style-type: none"> • Record data from computer printout • Collect ships and money • Bid for auctioned ships • Buy or sell ships in trading session • Place orders for new ship construction • Calculate and record fleet size • Allocate ships among fishing areas and harbor, and record on the decision sheet • Place ships on the game board • Give decision sheet to the computer operator • Develop your strategy for ending the game with the maximum possible assets. (This will be performed every (3) years or fishing rounds). <p>Debriefing Presentation – video format; Professor Emeritus. Dennis Meadows</p>	<p>Introductory Briefing Presentation</p> <ul style="list-style-type: none"> • Initial fishing company data is available online in the game simulation; students enter their decisions into the computer, rather than on a paper decision sheet • Bid for auctioned ships • Buy or sell ships in trading session • Place orders for new ship construction • Allocate ships among fishing areas and harbor <p>Debriefing Presentation – video format; Dr. John Sterman</p>

Fish Banks Game Kit Teacher Manual Table of Contents

1. Introduction to <i>FishBanks Ltd.</i>	1-1
History.....	1-1
Goals of <i>FBL</i>	1-2
Related materials.....	1-4
2. Guide to Conducting the Game	2-1
A note on your role.....	2-1
Use of the Role Description	2-1
Preparing for the game.....	2-2
Setting up the room.....	2-3
Figure 2-1: Typical room set-up for a game session with 4 teams	2-4
Figure 2-2: Form for the Team Performance Report	2-5
Creating the teams	2-5
Introducing the game	2-7
Conducting the Game.....	2-9
Pacing the fleet expansion	2-9
Conducting the auction	2-10
Auction by escalating bids.....	2-11
Auction by the Dutch method.....	2-12
Auction by sealed bid	2-12
Team decision making	2-12
Entering the data	2-13
Information for the teams.....	2-14
Information for the operator.....	2-14
Figure 2-3 Indices summarizing a typical game performance	2-16
Operator’s steps of play	2-16
Receive computer printout and record.....	2-17
Collect ships.....	2-17
Bid for auctioned ships.....	2-17
Buy or sell ships in the trading session	2-18
Place orders for new ship construction	2-18
Calculate and record the fleet size.....	2-18
Allocate ships among fishing areas and harbor; record decisions.....	2-19
Place ships on game board.....	2-19
Give Decision Sheet to the game operator	2-19
Facilitating the game	2-19
Debriefing	2-21
Figure 2-4: Principal causal loops in the <i>FBL</i> model.....	2-23
3. Guide to Operating the Computer Program	3-1
Caveat Emptor!!!	3-1
New features of Version 8.....	3-1

Transferring the software to your computer	3-3
Registering your software	3-4
Sample game session.....	3-5
Screen #1: Create New Game.....	3-6
Screen #2: About FishBanks	3-7
Screen #3: Initial Conditions.....	3-8
Initial Fish.....	3-9
Other initial values.....	3-10
Screen #4: Team Reports.....	3-11
Screen #5: Team Report	3-12
Screen #6: Operator Report	3-13
Figure 3-1: Relation of Ship Effectiveness to Fish Density	3-16
Figure 3-2: Relation of Fish Density to New Fish	3-17
Ship Salvage Value	3-18
Team Performance	3-19
Indices for Worksheet	3-20
Screen #7: Team Decisions	3-21
Two common data entry errors.....	3-23
Resuming the game	3-29
Notes on the sequence of calculations	3-31
Notes on using <i>FBL</i> in other languages	3-33
APPENDIX 1: Decision Sheet Terms	A-1
Annual Report.....	A-1
Change Number of Ships	A-1
Allocate Ships.....	A-2
APPENDIX 2: Steps of Play	A-4
APPENDIX 3: Answers to Questions Frequently Asked by the Participants	A-5
APPENDIX 4: Insights from the play of <i>FBL</i>	A-10
APPENDIX 5: Complementary Activities	A-12
APPENDIX 6: A Simple Renewable Resource Game.....	A-14

Fishbanks Simulation Instructors' Guide: Setup and Player Briefing Guide
Table of Contents

Table of Contents

1. Key Lessons
2. Before You Run a Game
 - a. Game Mode and Group Size
 - b. Choosing Settings
 - c. Authorizing Users
3. Class Plan for a Workshop (Live) Session
 - a. Room Setup and Seating
 - b. Introduction and Instructions
 - c. Logging In and Simulation Orientation
 - d. Starting Play
 - e. Normal Play
 - f. Crisis
 - g. Resolution
 - h. Game Wrap Up
4. APPENDIX 1: Example configurations
5. APPENDIX 2: Administering and Managing Regulation as an Instructor
6. APPENDIX 3: Tips for Playing Asynchronously
7. References

CC2015 – Fishbanks Simulation Guide, Grades 5th-12th

Complete Lesson at MIT Learning Edge

<https://mitsloan.mit.edu/LearningEdge/simulations/fishbanks/Pages/fish-banks.aspx>

(Also see the Creative Learning Exchange)

<http://static.clexchange.org/ftp/newsletter/CLEx24.2.pdf>

Contents

1. Overview
 - a. Learning Goals
2. Team Goal
3. Lesson Details
 - a. Preparation
 - b. Introduction and Community Creation
 - c. Preparation for Next Day
 - d. Running the Simulation
 - e. Debrief the Simulation
 - f. Connection Circle and Loop Examples
4. Curricular Connection Examples (NGSS Standards)
5. Acknowledgements
 - a. Credits
6. FishBanks Resources
7. FishBanks Handouts
 - a. FishBanks Simulation Requirements
 - b. Community Creation Tasks
 - c. Community Creation Summary
 - d. Simulation Record-Keeping
 - e. Finding Connections
 - f. Leverage Plan