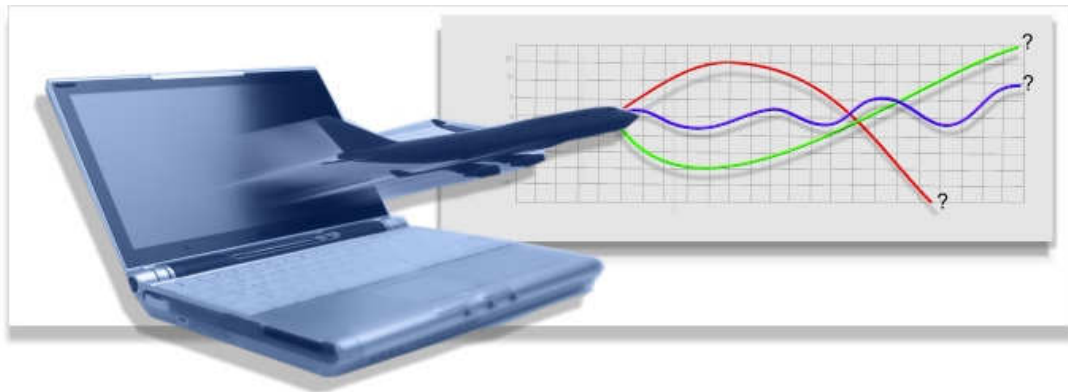


The logo for STELLA, consisting of a yellow circle with a white border and a white arrow pointing clockwise, containing a yellow 'S' with a white outline.

**STELLA<sup>®</sup> Education and Research**

***A range of training materials for systems thinking and  
system dynamics using STELLA<sup>®</sup> software.***

*Online training courses  
Learning environments*



*In association with isee systems, inc.*

## Contents

### ***Online training courses:***

Online training courses range in content from introductory and conceptual (pre-modelling) to more advanced modelling techniques using STELLA software and organisational learning.

***Applying Systems Thinking and Common Archetypes to Organisational Issues*** 3

***Model Building I: Learning and Applying the Basics*** 5

***Building More Effective Models: Unlocking the Hidden Treasures of STELLA*** 7

***Designing Effective Interfaces for STELLA*** 9

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### ***Learning environments:***

Learning environments are designed for use in training environments with a course tutor such as schools, colleges etc.

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#### **Course Requirements**

- STELLA or *iThink* version 9.
- Web browser
- Apple Quicktime Video Player
- Adobe Acrobat Reader



## Applying Systems Thinking and Common Archetypes to Organizational Issues

<b>Course Fee:</b>	£299 per 12-month, single-user subscription
<b>Team Discount:</b>	Contact us for multi-user pricing
<b>Format:</b>	Online, self-paced
<b>Estimated Time to Complete:</b>	40-60 hours
<b>Requirements:</b>	Internet access



### Overview

How your organisation thinks about problems has a lot to do with the quality of solutions it applies. All too often, organisations rush through problem solving, overlook the relationships between contributing factors, and fail to test assumptions before implementing an ineffective “fix.”

*Applying Systems Thinking and Common Archetypes to Organizational Issues* gives you and your colleagues a new way to think about and understand the challenges you face. You’ll be introduced to core Systems Thinking concepts and common archetypes, or systemic behaviours that guide organisations. You’ll see how Systems Thinking can improve problem solving and inspire organisational learning. Most importantly, you’ll apply Systems Thinking and common archetypes to issues that you and your organisation are actually facing.

### Course Modules

- Why the Systems View?
- Organizational Learning and Systems Thinking Framework
- Systems Language
- Planning Interventions
- Mental Models and Productive Conversation
- Systems Archetypes
- The Steps in Systems Thinking
- Systems Thinking On the Job

## Course Background

*Applying Systems Thinking and Common Archetypes to Organizational Issues* was adapted from a workshop entitled *Systems Thinking: A Language for Learning and Action* from Innovation Associates. Founded by Peter Senge, Innovation Associates brought the Systems Thinking approach into many Fortune 100 level businesses. Michael Goodman was Vice President at Innovation Associates, where he led the effort to develop this course for the web. Sherry Immediato, Managing Director of the Society for Organization Learning (SoL) and founder of Heaven & Earth Incorporated, adapted the original materials and contributed significant content to this course.

In 2002, Michael founded Innovation Associates Organizational Learning where he continues to teach and consult with organizations worldwide. Recognized as a leader in the field of system dynamics and Systems Thinking, Michael's specific interest is in developing and applying Systems Thinking to organizational change and learning. He was one of the developers of the systems archetypes—systemic patterns common to most workplaces that were forwarded in Peter Senge's widely read *The Fifth Discipline*. He has published widely and served as the primary contributor to the Systems Thinking chapter in the acclaimed *Fifth Discipline Fieldbook*.



## Model Building I: Learning and Applying the Basics

This recorded Web seminar series introduces the model building process and leads STELLA users through the creation of basic models that analyse issues relevant to business, research, and education.



**Fee:** £50 per session  
£150 complete series

**Format:** Online access to recorded presentations, handouts and exercises

**Topics:** *Session 1: The Modelling Process*

*Session 2: Tracking System Attributes*

*Session 3: Modelling Market Dynamics*

*Session 4: Modelling Supply and Demand*

### Overview

*Model Building I: Learning and Applying the Basics* leads STELLA users through the modelling process—from conceptualisation to testing to creation—in four, one-hour recorded presentations. Course instructor Chris Soderquist begins with the basic modelling building blocks of the Systems Thinking language—stocks and flows—adding tips on software mechanics along the way to show how simple, powerful models are created.

Each recorded session includes 30-45 minutes of instruction followed by Q&A. Online access to handouts that summarize session content, sample models and homework exercises will help cement learning.

### *Session 1: The Modeling Process*

Develop a sound modelling process that takes you and your team from model conception to creation (the modeling process is emphasised throughout the course). Learn the language of stocks and flows along with necessary software mechanics.

- How can Systems Thinking help explain the dynamics of a pandemic?

### ***Session 2: Tracking System Attributes***

Use models to track key attributes through a system and find out:

- How skill level increases as employees move through the human resource system (training, evaluation, etc.).
- How pollution moves through ecosystems like the Everglades.
- How changes in CAFE regulations will impact the overall fleet fuel economy over the next several decades.

### ***Session 3: Modeling Market Dynamics***

Build models of attractiveness dynamics and explore:

- How price impacts your market share relative to the competition.
- How community attractiveness leads to urban sprawl and other land use issues.

### ***Session 4: Modeling Supply and Demand***

Build models of supply/demand dynamics to see:

- The interrelationships between total inventory (yours and the competition's), price and market demand.
- How the globalization of food production and distribution impacts sustainability (economic, social, environmental).

### **About the Instructor**

Chris Soderquist is the president of Pontifex Consulting. Since 1998 he's worked with executives and middle-level managers to develop strategic solutions to complex issues. His clients include: Alcoa, Boeing, Hewlett-Packard, Mayo Clinic, NASA, Pfizer, Sony Ericsson, United Way, and the World Bank.

Chris' background in Systems Thinking began at Northwestern University where he first began integrating scientific methods with human decision making processes. He worked with isee systems (then High Performance Systems) for over four years, where he was a lead consultant, trainer, and learning environment developer. While at isee systems he helped develop and deliver *Introduction to Dynamic Modeling with STELLA and iThink*.

The author of many articles on Systems Thinking, Chris contributed a chapter on the Strategic Forum™ in, *The Change Handbook: Group Methods for Shaping the Future* (Berrett-Koehler, 1999). Along with Barry Richmond, Chris co-developed the interactive teaching tool *Systems Thinking: Taking the Next Step*.



## Building More Effective Models: Unlocking the Hidden Treasures of STELLA

**Fee:** £50 per session  
£150 complete series

**Format:** Online access to recorded presentations,  
handouts and exercises

**Topics:** *Session 1: Storytelling*

*Session 2: Sensitivity Analysis*

*Session 3: Arrays*

*Session 4: Data Import/Export*



### Overview

*Building More Effective Models: Unlocking the Hidden Treasures of STELLA* will help STELLA users sharpen their model building skills and unlock the power of often overlooked/underutilised features.

Through four, one-hour recorded presentations, you'll learn to create models that engage your audience, make convincing arguments, and effectively simulate future scenarios. Led by instructor Chris Soderquist, you'll explore the potential of storytelling, sensitivity analysis, array, and data import/export features.

Each recorded session includes 30-45 minutes of instruction followed by Q&A. Online access to handouts that summarize session content, sample models and homework exercises will help cement learning.

### Key Software Topics

#### *Session 1: Storytelling*

Create engaging, convincing models using storytelling features like simulating visible model structures, highlighting feedback loops, organizing chapters, adding buttons and annotating your story.

#### *Session 2: Sensitivity Analysis*

Find out how your model performs under extreme conditions, identify a parameter's level of influence, and create confidence in the likelihood of future behaviours.

### ***Session 3: Arrays***

Quickly represent high levels of detail (differentiate regions, product lines, organisational specifics) without increasing the visual complexity of your model.

### ***Session 4: Data Import/Export***

Utilize pre-existing data sets by adding dynamic data links to your models. Import/export reduces data entry time, increases accuracy, and allows for more sophisticated reports, graphs, and tables.



## Designing Effective Interfaces for STELLA Models

This recorded web seminar series introduces STELLA and *iThink* users to basic and advanced interface features and design principles. The course is intended for consultants, researchers, teachers and other System Thinkers who want to create and share easy-to-use, engaging models.



**Fee:** £50 per session  
£150 complete series

**Format:** Online access to recorded presentations, handouts and exercises

**Topics:** *Session 1: Overview and Navigation*

*Session 2: Control Panels*

*Session 3: Message Posting*

*Session 4: Design Principles*

### Overview

*Designing Effective Interfaces for STELLA and iThink Models* will help STELLA and *iThink* users take maximum advantage of interface creation features. Instructor Chris Soderquist guides you through basic interface design principles and provides step-by-step instruction of the software mechanics.

Each recorded session includes 40 – 50 minutes of instruction followed by questions and answers. Online access to handouts that summarize session content, sample models and homework exercises will cement learning.

### Course Syllabus

#### *Session 1: Overview and Navigation*

Explore a range of interface designs and situations where interfaces enhance the effectiveness of sharing STELLA models.

Create simple navigation sequences with a consistent “look and feel” and that set the stage for implementation of more advanced features.

### ***Session 2: Control Panels***

Build control panels into your models that:

- allow for experimentation without requiring modelling skills.
- focus users on key variables to help build structural understanding.
- emulate balanced scorecards, dashboards and other special interfaces

### ***Session 3: Message Posting***

Use STELLA message posting features to initiate sounds, play movies, or guide navigation based on model conditions. Create messages that provide coaching, offer learner feedback and engage users with your model.

### ***Session 4: Design Principles***

Make models conducive to learning by setting objectives and developing an overall architecture that meets them. Follow design principles and guidelines to create easy-to-use and engaging interfaces for different types of models — learning labs, interactive presentations, flight simulators, scenario tools, etc.



## Improving Performance with STELLA Simulations

This recorded web seminar series demonstrates how to apply *iThink* and STELLA to organizational performance issues. The course is intended for modelers at all levels who wish to learn new software techniques and build skills applying the dynamic modeling process.



**Fee:** £50 per session  
£150 complete series

**Format:** Online access to recorded presentations, handouts and exercises

**Topics:** *Session 1: Process Improvement*

*Session 2: Strategic Forums*

*Session 3: Strategy Mapping and Scorecards*

*Session 4: Scenario Planning*

### Overview

*Improving Performance with STELLA Simulations* will help you apply dynamic modeling to real-world business performance issues. Instructor Chris Soderquist guides you through a modeling process and provides step-by-step instruction to create models for re-engineering systems, tracking scorecards and planning for future scenarios.

Each recorded session includes 40 – 50 minutes of instruction followed by questions and answers. Online access to handouts that summarize session content, sample models and homework exercises will cement learning.

### Course Syllabus

#### *Session 1: Process Improvement*

Build models that simulate business processes. Identify issues and safely test the effect of new ideas and inputs on manufacturing, financial, human resource, operational or other organizational systems.

Learn mechanics of process improvement features such as:

- discrete stock types—conveyors, queues, ovens
- leakage flows
- CYCLE time
- graphical functions
- random number generation

### ***Session 2: Strategic Forums***

Develop a Strategic Forum to test the assumptions behind the “physics” of a strategy. Create a dynamic model with an interface that helps to build strategic understanding and answer questions like:

- How do you know if a strategy is capable of achieving targeted performance?
- How do you get consensus on what parts to modify?
- What are the barriers to implementation?

### ***Session 3: Strategy Mapping and Scorecards***

Take strategic management methods to the next level by applying them to the dynamic modeling process.

Create operational maps understood by diverse stakeholders and work backwards to build a model from your organization’s scorecard or dashboard. Identify leading indicators to initiate corrective action.

### ***Session 4: Scenario Planning***

Identify multiple scenarios for the future of your organization, country or community. Build model interfaces that facilitate scenario exploration of methods for choosing among disparate outcomes.

Learn software techniques for Monte Carlo simulations, linking to data sources, and applying statistical tests.



## Success with System Dynamics: Maximizing the learning value of STELLA models

This recorded web seminar series guides you through an integrated approach to modelling. Instructor Jenny Kemeny uses real-world examples gained through 20+ years experience to demonstrate techniques that will help you maximize the impact of models and the learning experience they drive.



**Fee:** £199 complete series

**Format:** Online access to recorded presentations, handouts and exercises

**Topics:** *Session 1: Defining the Learning Objective*

*Session 2: Getting Results from Small Models*

*Session 3: Developing a Custom Learning Model*

*Session 4: Creating a Learning Experience*

### Overview

*Success with System Dynamics* guides consultants, educators, researchers and other Systems Thinkers through the process of preparing a model for use with clients, students, or other colleagues. Instructor Jenny Kemeny begins by exploring learning objectives and understanding the model's "end users" and continues through actual model building, designing a learning experience, and bridging the simulation to the real world.

Each recorded session includes a 60 minute presentation. Online access to recorded sessions, case studies, sample models and homework exercises incorporating your own real-world modeling projects will help cement learning.

### Course Syllabus

#### *Session 1: Defining the Learning Objective*

Consider your audience and define the learning objectives of your model.

- Who is the model's end-user?
- What is the model's objective?
- How should the end-user be involved in the modeling process?
- What should be modelled?

### ***Session 2: Getting Results from Small Models***

Build small, defined model prototypes that test effectiveness for end-user learning.

- What part of the model gets built first? Next?
- How is the prototype most effectively tested?
- How should the end-user be involved in testing?

### ***Session 3: Developing a Custom Learning Model***

Learn how to assess prototype results, move onto more sophisticated models when needed, and tailor the model to the end-users learning needs.

- Did the prototype meet learning objectives?
- How can end-user “buy-in” begin during the modeling process?
- How should the end-user be engaged in the final model-driven learning experience?

### ***Session 4: Creating a Learning Experience***

Maximize the individual and collective impact of models and the learning experiences they drive.

- What is the overall flow of the learning experience?
- How should models be documented?
- How can you facilitate the learning experience and create simulations that relate to the real world?

### **About the Instructor**

Jennifer Kemeny is a highly respected and influential consultant in the organizational learning field and is particularly known for breaking new ground in the fields of system dynamics and Systems Thinking.

For over 25 years she has pioneered powerful approaches that lead to critical insights, renewed motivation and fundamental transformation with her clients. She has worked with Sr. Executives in the world’s largest organizations (including Royal Dutch Shell, FedEx, Proctor & Gamble, Georgia Power, Arthur D. Little), as well as start-up companies, educational institutions, hospitals, and a number of non-profits (including The Search Foundation, New England HealthCare Association).

Jennifer pursued her doctoral studies in system dynamics at MIT’s Sloan School under the advisement of Peter Senge. She was his principal associate in experiments which carried Systems Thinking and Learning Organization concepts into companies. This work was an important part of Senge’s best-selling *The Fifth Discipline*.



# Food Chain

*Learning Laboratory in Environmental Science*

**Teacher license fee:** £59

Learning is most exciting when there is opportunity to experience and discover what happens. Food Chain offers a practical way to conduct experiments and investigate a simple lake ecosystem. Students deepen their understanding of natural systems as they learn by doing.

Biology and Environmental Science classes at all levels, from middle school through high school and introductory college courses, use Food Chain to explore a virtual lake ecosystem and conduct computer simulation-based experiments to test hypotheses.

*"To say that I was impressed with Food Chain is an understatement. Not only does the program reinforce the concepts of the interconnectedness of natural systems, it also challenges students to think critically."*

*Dr. Dean Goodwin  
AP Environmental Science Teacher  
KUA, Meriden, NH*

Students build a sound understanding of ecosystem relationships, including:

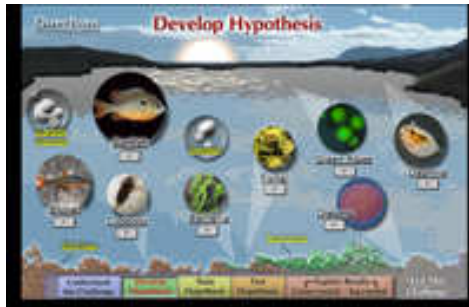
- Interdependencies between the four trophic levels
- Factors that affect population, births, deaths and carry capacity
- Dynamics of oxygen, carbon dioxide, detritus, and nutrient levels

## **Inquiry-Based Approach**

Using an inquiry-based approach to learning, Food Chain presents specific challenges for students to design their own experiments and test their hypotheses through simulation. Challenges pose questions like:

- Which two species can survive in the lake by themselves for 90 days?
- What is the minimum number of species needed to keep the sunfish alive?
- How will various housing development proposals impact the lake ecosystem?

Outcomes of experiments must be explained even if they were not successful. Graphical output and data analysis help students rationalize their results and, if necessary, reformulate another hypothesis.



Students are presented with challenges to formulate their own hypotheses.



Hypotheses are tested using computer simulation.

### Critical Thinking Skills

Food Chain challenges students to think critically as they hone their skills in applying the scientific method. Students are guided through the steps of formulating and testing hypotheses, interpreting data, analyzing graphs, and suggesting reasons for the results.

Systems Thinking concepts introduced while exploring a lake ecosystem are reinforced in an optional Generalizing section. Students are challenged to apply concepts like “feedback loops” and “unintended consequences” to issues in their own life.



Students develop data analysis skills as they explain results.

### Package Includes:

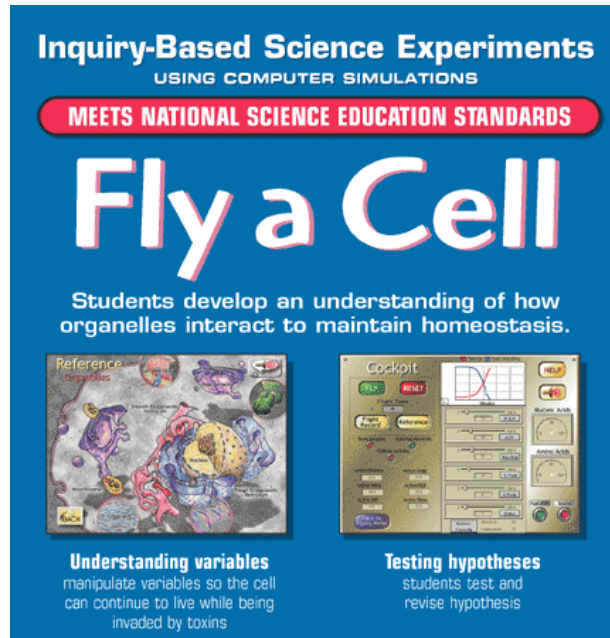
- Teacher's Guide
- Food Chain Learning Laboratory CD (Mac and Windows)  
(May be installed on teacher's computer and computers intended for student use.)

## Fly a Cell

Teacher license fee: £59

Biology is about "systems"—how things work together, such as the organs within an organism. Interdependency is the name of the game. Fly a Cell is the perfect match for teaching this lesson.

Fly a Cell is an inquiry-based science experiment that takes students from beyond memorizing names and functions to building their understanding of how cells work as dynamic systems.




**Inquiry-Based Science Experiments**  
USING COMPUTER SIMULATIONS


**MEETS NATIONAL SCIENCE EDUCATION STANDARDS**

# Fly a Cell

Students develop an understanding of how organelles interact to maintain homeostasis.



**Understanding variables**  
manipulate variables so the cell can continue to live while being invaded by toxins

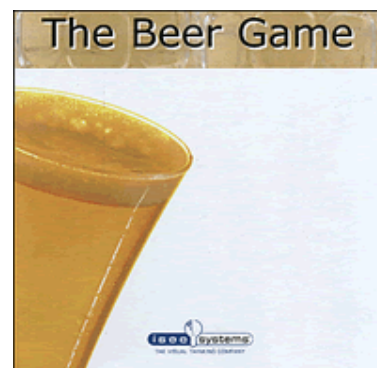


**Testing hypotheses**  
students test and revise hypothesis

## Beer Game

Downloadable (Win): £15

You play the role of a manager running a retail operation trying to maintain inventory in the face of uncertain demand. With this interactive CD-ROM, try your hand at this simple adaptation of the timeless board game.



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isee systems, inc.  
Wheelock Office Park  
31 Old Etna Road  
Lebanon, NH 03766

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