



# THE CREATIVE LEARNING EXCHANGE

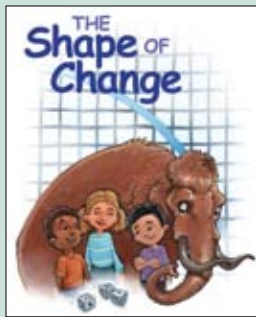
27 Central Street, Acton, MA 01720 • Phone: 978-635-9797 • Fax: 978-635-3737 • e-mail: stutzln@clexchange.org • www.clexchange.org

## OUR MISSION

To develop Systems Citizens in K-12 education who use systems thinking and system dynamics to meet the interconnected challenges that face them at personal, community, and global levels.

## OUR PHILOSOPHY

The Creative Learning Exchange encourages an active, learner-centered process of discovery in K–12 education that challenges preconceptions, deepens conceptual understanding, and engages in meaningful, real-world problem solving through the mastery of systems thinking and system dynamics modeling.

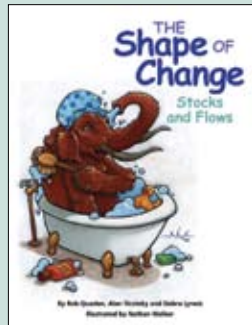


## The Shape of Change

*The Shape of Change*, by Rob Quaden and Alan Ticotsky, with Debra Lyneis, contains eleven lessons with easy preparation and directions for elementary and middle school classrooms.

## The Shape of Change: Stocks and Flows

This book by Rob Quaden, Alan Ticotsky and Debra Lyneis takes the lessons of *The Shape of Change* and illustrates the use of stock/flow diagrams as a debriefing tool for the games.



For more information on these books, or to purchase them, go to the CLE Web site: [www.clexchange.org](http://www.clexchange.org) or e-mail [milleras@clexchange.org](mailto:milleras@clexchange.org).

## The Foundations

**The Creative Learning Exchange builds on two foundations—systems education and learner-centered learning.**

### Systems Education

The natural and social worlds are composed of systems. Systems of interconnected and interacting parts cause all processes of change. Systems exist in the interactions among people, economic forces, and environmental responses. Families are systems, as are schools, cities, national economies, and relationships between countries. Social systems determine growth of the drug culture, and the dynamics of economic business cycles. In technology, interacting system components describe why a clock pendulum swings, how a chemical plant works, and the action of an autopilot guiding an airplane. Systems underlie everything we do.

A systems education can unify subjects that have existed in independent compartments. Mathematics, science, social studies, economics, biology, psychology, environmental issues, political science, and literature have a common systems basis. A systems education creates the capacity for systems thinking through the use of system dynamics tools and concepts.

Even though each of us is a part of many different systems, the nature of systems has not been taught in traditional primary or secondary education. An understanding of the universal nature of systems using system dynamics concepts is now within reach of students from kindergarten onward. More clearly defined systems concepts are now available. In addition, today's computers and software are user friendly and readily available.

The first years of a systems education might concentrate on creating an awareness of systems, developing, through description and guided observation of everyday events, special games to demonstrate the nature

of systems, and working with computer simulations. Use of the system dynamics tools, including computer simulations, behavior-over-time graphs, stock/flow diagrams, and causal loops, aids in developing the causal, endogenous\* view which characterizes systems thinking.

### System Dynamics

System dynamics deals with the structure of systems and how systems generate growth, stagnation, oscillation, and decay. Fundamental concepts support an education that includes applications in different academic subjects. Systems principles organize material in students' studies. An understanding of systems gives meaning to situations in a student's own life.

The professional field of system dynamics has been developing for over 30 years. Most countries now have people trained in system dynamics. The first demonstrations of system dynamics in middle school education took place in the fifth and sixth grades in the 1970's.

### Learner-Centered Learning

Learner-centered learning converts a classroom from a lecture setting with students as passive listeners into a participative process in which students experience the excitement of learning through discovery. Learner-centered learning substantially alters the role of a teacher. A teacher is no longer a dispenser of knowledge addressed to students as passive receptors. Instead, small teams of students work together to help one another. The teacher becomes a coach and participating learner.

\*endogenous: from within. "Systems thinking is the effort to look within and find the system as cause." George Richardson, CLE conference, 1998

## How to be part of the CLE network

There is a registration form at the CLE Web site [www.clexchange.org](http://www.clexchange.org). You may fill it out and submit it. You will then automatically get notification about the newsletter and will be put on our mailing list for future conferences. Alternatively, you can e-mail, write, or call us and tell us you want to be in our network.

The CLE also monitors the **K-12SD listserv**, a wonderful way to make connections and find resources within the K-12 community, to share your experiences, and to ask questions of both experienced teachers and world-class system dynamics experts. To subscribe to the K-12SD listserv, send an email message to [listserv@sysdyn.clexchange.org](mailto:listserv@sysdyn.clexchange.org) with the line "subscribe k-12sd first-name last-name" as the *only* thing in the message's body; for example, "subscribe k-12sd Lees Stuntz" if you are Lees Stuntz. Remember that the quotation marks are not to be included in your message, just the words.

## How to subscribe to the Newsletter

The Creative Learning Exchange publishes a quarterly newsletter, *The Exchange*, which includes stories about what is going on in systems education in K-12, as well as curricula created by teachers incorporating systems education. You can receive it any of three ways:

1. An e-mail message that the newsletter has been posted at the Web site. To order, e-mail [milleras@clexchange.org](mailto:milleras@clexchange.org).
2. An e-mail with the newsletter attached in Adobe Acrobat format. To order, e-mail [milleras@clexchange.org](mailto:milleras@clexchange.org).
3. Through US mail. For cost reasons to us, we prefer the first two means.

All methods are still free within the US. There is a \$15.00 annual charge for postage outside the US.

## How to get materials from CLE

The CLE facilitates communication among teachers and schools to help create a network of those utilizing systems education. We solicit and develop ideas and teaching materials from participating educators.

The curricula and other documents are available on the Internet or a CD. Among them, the CLE offers an introductory packet that further explains the concept and methods of systems education.

### ● On the Internet

You can access CLE materials directly by going to [www.clexchange.org](http://www.clexchange.org) and downloading them. All the documents on the site are in Adobe Acrobat. All models are in STELLA®. A run-time version of STELLA is available from isee systems: [www.iseesystems.com](http://www.iseesystems.com).

### ● On CD-ROM

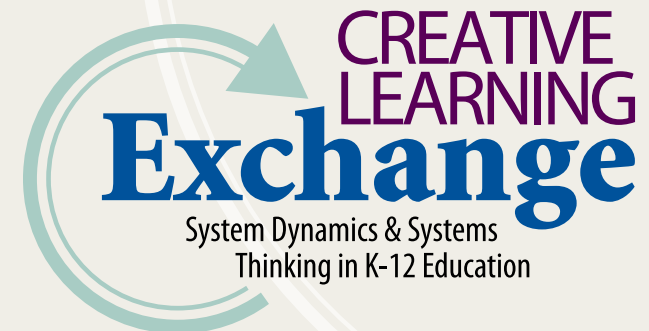
The CD contains all the materials from our Web site; this includes handouts from the most recent conference and all issues of our newsletter, *The Exchange*. The charge is \$25.00 in the US, and \$30.00 outside the US, postpaid. You may order at [www.clexchange.org](http://www.clexchange.org), or mail your order with a check in the appropriate amount made payable to the Creative Learning Exchange.

## ...that School in Tucson DVD



This DVD and accompanying booklet revisit students from Tucson, AZ thirteen years later to hear how systems thinking engaged them in real-world problem solving and had a lasting effect on their critical thinking skills, attitudes and habits of mind.

For more information on this DVD and booklet, or to purchase them, go to [www.clexchange.org](http://www.clexchange.org) or e-mail [milleras@clexchange.org](mailto:milleras@clexchange.org).



**Lees N. Stuntz, Executive Director**

**Creative Learning Exchange**

**27 Central Street**

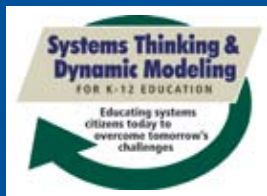
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## Systems Thinking and Dynamic Modeling Conference

The CLE hosts a biennial conference on systems thinking and dynamic modeling. Speakers and presenters are teachers, administrators, and experts in system dynamics. For more information, go to [www.clexchange.org](http://www.clexchange.org) or e-mail [milleras@clexchange.org](mailto:milleras@clexchange.org).