



modeling real world challenges

Addressing issues of systemic complexity involve feedback processes that are not always obvious. Using systems thinking followed by computer simulation provides an essential step in testing hypotheses that could be useful in mitigating some of the undesirable side effects core to the issues of sustainability and successful management of diverse systems.

The building of simulations can be used as a vehicle to bring the study of dynamic problems (natural resource depletion, the spread of epidemics, the path of a rocket, etc.) to a new, more visual level for a broad audience of students. Student model-building lessons develop a more holistic approach to problem solving. Students learn to build diagrams that describe the structure of a problem, identify feedback control mechanisms, and start to think about math and/or science based on patterns of change over time. System Dynamics Modeling is a powerful analytical approach that addresses many STEM, Common Core – Math, Next Generation Science, and 21st Century Skills and Standards. It adds value to a classroom through active, student-centered lessons that address real-world problems in a much more conceptual format.

Teachers who are new to System Dynamics (SD) modeling and want to learn this problem-solving approach now have a sequence of courses that provide a gentle introduction to SD analysis.

A sequence of three online courses teaching System Dynamics modeling for math and science instructors (of students ages 15 to 20+) has been developed. These courses provide extensive hands-on model building activities for the participants that can then be modified (or used as-is) for their students. The model-building lessons have been tested in a classroom setting.

## Why we need to build models

*"The deepest systemic insights are gained by either building or using computer simulations to test assumptions."*

— Jay Forrester

*"We cannot solve our problems with the same thinking we used when we created them."*

— A. Einstein

<sup>1</sup>Winner of the Lifetime Achievement Award bestowed by the System Dynamics Society, Presidential Award for Excellence in Teaching, Intel Innovation in Teaching Award (First place). Director of two NSF grants. Author of five books. Modeler. Teacher.

# Learn System Dynamics Modeling to Address National Standards in Math and Science

AN ONLINE PROFESSIONAL DEVELOPMENT OPPORTUNITY

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Learning materials created specifically for each participant group.

Offered cooperatively by CC Modeling Systems and Seattle Pacific University's Continuing Education (SPU)/Graduate School of Education

## The Three Courses

- 1st Course in System Dynamics Modeling: Basic Models
- 2nd Course in System Dynamics Modeling: More Advanced Models
- 3rd Course in System Dynamics Modeling: Building Models from the News

## Course Details

Each course consists of 10 sessions and will be capped at 15 participants.

Logistics: See [ccmodelingsystems.com](http://ccmodelingsystems.com)

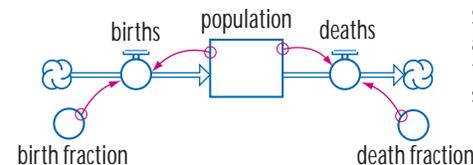
Credit option: Each course has a 3-credit option attached, awarded by Seattle Pacific University.

Cost: The cost for the course is \$575 without credit. The cost of three continuing education credits is an additional \$165 through Seattle Pacific University.

Questions: 503-708-4642 or by email, [dfisher@ccmodelingsystems.com](mailto:dfisher@ccmodelingsystems.com)

## Course 1: Basic Models

This course is intended for any mathematics or science instructors who are interested in learning to use small model-building activities in their classroom to supplement their current course content. Numerous lessons are provided. No background in system dynamics is required.



System Dynamics is a method of analysis that uses computer simulation to study the feedback interactions of a system to understand its behavior.

## Course 2: More Advanced Models

For those mathematics or science instructors who want to learn even more powerful SD modeling techniques, this second course will give them an opportunity to expand their knowledge and the depth of analysis for problems that are very relevant for the 21st century curriculum.

## Course 3: Building Original Models from the News

The final course is for those teachers who want to go the final step and develop the skill to take a problem of interest to them and develop a working simulation from scratch. These teachers will develop skill that will allow them, if they are interested, to teach a modeling course (one semester or one year in length) at their school.