

INTERDISCIPLINARY, NATURALLY

“What It’s Like to Be a Pioneer”

Prepared
With the Support of the
Gordon Stanley Brown Fund

By
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Schools are always looking for ways to make their curriculum interdisciplinary, but sometimes attempts to link together separate elements of a traditional curriculum can feel contrived. The subjects may be covered at the same time, but they don't really work together. With system dynamics modeling, however, work becomes genuinely interdisciplinary by nature.

Teachers in the Carlisle, Massachusetts Public Schools discovered this by accident several years ago. Eighth grade math teacher Rob Quaden and science teacher Jim Trierweiler had been introduced to system dynamics and were beginning to consider its application in each of their classes. System dynamics seemed like a good idea, but it also seemed very difficult and they were not sure just where it would fit in the curriculum.

As it happened, Rob's advanced math class was working on curve fitting at the time; students were determining graphs based on data points using various techniques. Meanwhile, in Jim's class the students were conducting a physics of motion experiment rolling cars down ramps and measuring the distances they traveled down the hall. After the experiments were completed, Jim asked his students to graph their results in their lab teams. Jim observed that some students were using advanced graphing techniques and successfully explaining them to their teammates. Surprised, he asked them where they had learned to do that. "Oh, this stuff is easy," they said. "We are learning this in math. See how perfectly it works for this experiment."

Jim couldn't believe it! He practically bounded down the hall to Rob's classroom to show him the connection that the students had made on their own. On the spot, the two teachers decided to graph the physics results in math class and then build a system dynamics model to explain the observed behavior. In science, meanwhile, they would use the model to understand and extend the experiment by manipulating the variables.

This was Carlisle's first model built to serve a real purpose in the curriculum, and both veteran teachers felt that this had been their first genuinely interdisciplinary experience. Surprisingly, the modeling added new breadth and depth to the original lessons—students asked much better questions. Building this first model was difficult, but the teachers worked together and sought help from others. They also decided to continue on with system dynamics. The rest is history.

[Note: The science lesson and model are available on-line from the Creative Learning Exchange <http://www.clexchange.org>. Under Cross-Curricular Materials, look for "Let It Roll" by Rob Quaden, James Trierweiler, and Debra Lyneis, prepared with the support of the Gordon Stanley Brown Fund, 1996.]

Jay Forrester has suggested that we could speed the spread of learner-centered-learning and system dynamics in K-12 education by sharing tales of "what it's like to be a pioneer." It might help others who are starting out, or just curious, to know about other teachers' experiences, positive student outcomes, pitfalls, political issues, responses of administrators and fellow teachers, student and parent feedback, triumphs and tribulations. Forrester has long experience in pioneering, first as an early inventor of the digital computer, then as the founder of system dynamics, and now as an education reformer. This paper presents just one little vignette. Please let me know (LyneisD@clexchange.org) if you have other tales to share. Thanks.