Impact on Teaching and Learning

Research Education in the Classroom

Case Study

Research Education at a New York City School

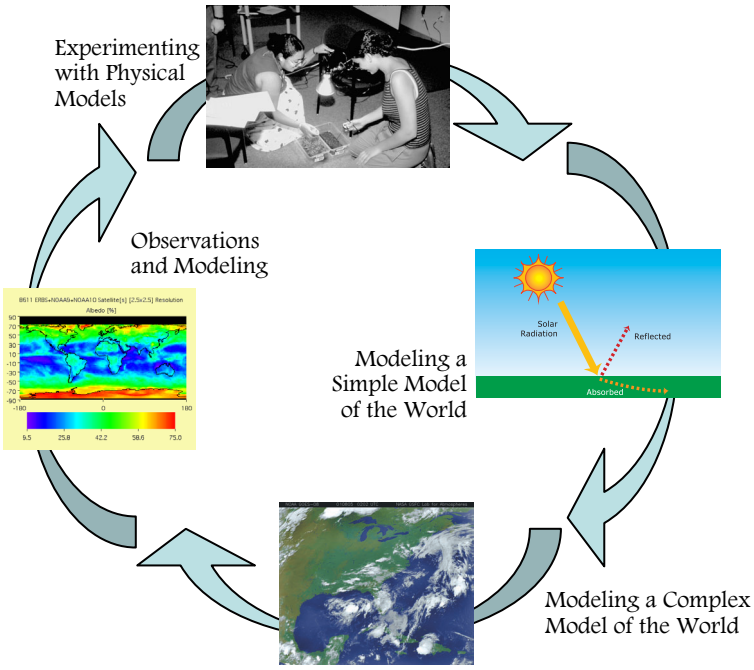
Physics teachers on the ICP Clouds, Storms and Climate Change team, Robert Kruckeberg and Christopher Petersen, and their science advisor, George Tselioudis, developed a web module that is based on their research and New York Science Standards: http://icp.giss.nasa.gov/education/cloudintro/.

In 1998, Robert field-tested the module in a research course created at A. Philip Randolph High School in Manhattan, New York. Students explored factors contributing to the habitability of a planet. They analyzed satellite data for Venus, Earth and Mars atmospheres. The class used weather station data to estimate Earth's average temperature. In controlled experiments they analyzed some of the factors affecting planetary temperature.

Robert identified several benefits to the research education module. These included: exposing students to issues driving a research community and developing their skills to use computer software and interpreting data that represent the complex climate system. Based on student work, however, he realized improvements were needed to help them understand the natural variables represented in data and scientific methods. He advocated more opportunities for designing experiments, using scientific instrumentation, critiquing data and methods and testing hypotheses. All of which were ultimately adopted in ICP curriculum development activities.

Robert Kruckeberg received his doctorate from Teachers College at Columbia University and is a member of the Education faculty at Pace University, New York.

Results: A Research Education Learning Cycle:



Reflections From

Teachers

"There's much discussion in the education about how to engage students in "real" science problem solving. My perspective has been greatly influenced by the ICP research education. I am now as concerned with having my students develop sound results and justifications as I am in their formulating good questions and problems."

Brendan Curran
Physics Teacher

"The pollen research project at George Washington created an oasis of support and experience in an inner city school where… students never imagine life outside of Washington Heights. ICP is a community of science learning… a second family, facilitating high standards for achievement."

Katherine Chance
Biology Teacher

"Environmental awareness is a key outcome. My students compared sunphotometer data with daily weather reports and visibility measurements they took and make judgments and correlations about air quality and weather."

Courtney St. Prix
Chemistry Teacher