Abstract Submitted
for the FWS15 Meeting of
The American Physical Society

Modeling Climate Change in a Test Tube BRIAN RASNOW, Dept. of Applied Physics, California State University, Channel Islands — Climate models predict the Arctic will be free of ice within decades or less. A simple classroom experiment is described providing a readily understandable and compelling context to discuss implications of this climate change, and meta-issues such as the value and significance of models, measurements, and the scientific method. The activity begins by asking students to predict the temperature evolution (T(t)) of a small sample of H_2O upon removal from a freezer. We then measure T with a thermocouple frozen in the ice. Most students are surprised at the plotted function, and are engaged to explore how physical models incorporating concepts of latent heat, heat capacity, and thermal conduction, provide logical explanations of their data. They are also encouraged to reflect on the nature of errors in prediction. I next state that our graph of T(t) is *extremely* frightening, which further intrigues the students. I challenge them to generalize – how might our model of water and ice in a test tube relate to the Arctic on a warming planet? Most students quickly realize that melting ice (anywhere) isothermally absorbs heat, and once the ice is gone, the warming rate will rapidly accelerate. Engaged discussions about science, education, and politics of climate change generally follow.

Brian Rasnow
Dept. of Applied Physics, California State University, Channel Islands

Date submitted: 09 Oct 2015 Electronic form version 1.4