Eli E Goldwyn* (goldwyn@up.edu), University of Portland, 5000 N Willamette Blvd, Portland, OR 97203. Two Inquiry Based Learning Modeling Activities: The Warming of Cold Water in a Bottle and Using Phase Models to Describing Oscillating Populations.

We start by introducing a modeling scenario that should be appropriate for the first week of an introductory undergraduate differential equations course. This scenario steps through the creation and understanding of a differential equation by describing how fluid in a water bottle will change temperature and what factors influence the rate of temperature change. The second modeling scenario walks the student through the process of modeling and analyzing equilibria behavior of an oscillatory system through the use of phase variables with a focus on predator-prey oscillators. (Received September 17, 2019)