Mathematical Modeling as a Means of Intentional Development of Intuition.

Frequent appeals for teaching mathematical modeling hinge on connections to the real world: accessibility and interest, opportunity for multiple valid solutions, and ability to reason about the world. Yet if students are to capitalize on accessibility and interest to yield viable reasoning and solutions, they need intuition for working with concrete observations as well as abstractions. We discuss experiences creating modules to develop such intuition. We drew from the ideas of (1) a math modeling cycle (e.g., Ferri (2006)) – that modeling can be structured by repeated, systematic inquiry into the real life situation, the situation model, the mathematical model, and the results of each; and (2) mathematization (e.g., Quine (1993)) – “translating” from common to mathematical language. We used our module to teach applications and writing in calculus and ordinary differential equations, as well as in high school extracurricular mathematics activities. We discuss lessons learned, highlighting cases about the fishing industry, the West Nile virus, and passenger pigeons. We share guidelines used for coaching students through the modeling cycle and rubrics for grading work. We hope that this discussion will help others adapt and refine our experiences for their own contexts. (Received September 24, 2012)