



Cornell University

K-12 Education and Outreach, Mathematics Department

MATH 5080 – Mathematics for Secondary School Teachers

October 29, 2016 ◆ 9:00 AM – 2:30 PM (lunch provided) ◆ 406 Malott Hall

8:45 – 9:00 AM **Bagels & Juice (provided)**

9:00 – 9:15 AM **Introductions**

9:15 – 11:30 AM **Mathematical Modeling: Underlying Representations and Inferences**

We will consider how different representations both facilitate and hinder understanding of mathematical ideas in modeling contexts. Depending on participants' interests we will consider moving couches around corners, optimizing door hinges, the mathematics of paper cups, or designing optimal diagnostic medical testing protocols with imperfect tests. We will explore how encouraging varied approaches to mathematical modeling and problem solving leads to different insights and can engage a wider diversity of students. The problems can be adapted for use with middle school through high school students and will draw primarily upon coordinate geometry and probability. Through several mathematical modeling topics the theme will be representations and extending or modifying prompts to match and challenge a range of student interests and abilities.

Speaker: Paul Kehle (Hobart & William Smith Colleges)

11:30 AM – NOON **Lunch (provided)**

12:00 – 12:50 PM **Mathematical Modeling of Lead Poisoning**

Recent developments in mathematical modeling have given new insight into biological processes. In this talk I will describe a way in which ordinary differential equations have been employed to explain such concepts as drug dosages and the effects of pollutants on the human body. I will then use the above methodology to construct a model showing how the human body reacts to high levels of lead in the drinking water system.

Speaker: Tom Rishel (Cornell University, retired)

1:00 – 2:25 PM **The Algebra of Geometric Transformations**

We will examine composition of geometric transformations as an algebraic operation, and then use our findings as a tool for decomposing transformed images. We will explore questions such as: How many different compositions are there? When are compositions commutative? And what is the longest chain of compositions necessary to superimpose two figures? This is relevant to Common Core State Standards for middle- and high-school mathematics. Access and use of GeoGebra is encouraged, but not required.

Speaker: Steve Weissburg (Ithaca High School)

2:25 – 2:30 PM **Wrap-Up**

RSVP by Thursday, October 20, 2016

Registration Form: <https://www.math.cornell.edu/m/Community/5080#form>

Questions? Contact Mary Ann Huntley (huntley@math.cornell.edu)