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The Consortium for Mathematics and Its Applications (COMAP)

Our Mission

COMAP's mission for the 40 years of our existence remains the improvement of the teaching and learning of mathematics for students of all ages through the use of contemporary applications and mathematical modeling.



What Is Modeling?

“Mathematical Modeling is a process that uses mathematics to represent, analyze, make predictions or otherwise provide insight into real world phenomena”

GAIMME Report, COMAP and SIAM 2016



Stuff

We have produced student and teacher materials, mostly at the high school and undergraduate level in print, video and mixed media ranging from individual lesson length modules, to television courses, to a full high school four year textbook series.



Q: Why do we teach mathematics through modeling?

A: So we can engage students in mathematical activity and increase their understanding of and their ability to navigate the world around them.



It's A Process

Mathematical modeling is a process that should be part of every mathematics course. We don't teach mathematical models, we teach students the process of modeling. This enables them to own their work in mathematics.



In addition to curriculum and teacher development materials we have created a number of international mathematical modeling contests.

- **Mathematical Contest in Modeling (MCM, 1985)**
- **Interdisciplinary Contest in Modeling (ICM, 1999)**
- **High School Mathematical Contest in Modeling (HiMCM, 1999)**
- **International Mathematical Modeling Challenge (IM²C, 2015)**



It's Real

Pedagogically, modeling lends itself to working in groups, to working on extended tasks and to effective use of outside resources. It demonstrates that problems in the real world may need mathematics from several different areas to analyze – algebra, geometry, statistics, etc.



Example Problems

- You have a group of athletes you need to test for steroids. At what percentage of drug use in the population does it pay to pool the blood samples?
- How many miles (m) are you willing to drive to buy gas at (c) cents less a gallon?
- You are programming a bank of elevators in an office building. Do you plan for them to automatically come back to the lobby if they aren't called or to stay at the last floor until they are called? Does that change depending upon the time of the day?



Example Problems

- Your state has a referendum on preferential voting. What does it mean and do you vote for or against it?
- LeBron James is fouled and the announcer says he's shooting free throws at 78%. He goes one for two in the first half. He's fouled again in the second half and the announcer says he is now shooting 76%. Is that possible and if so how many free throws has he taken and how many has he made?

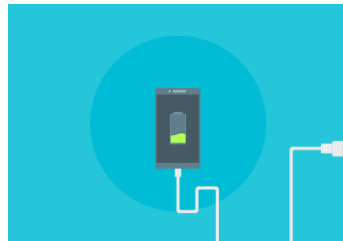


Example Problem

Charge!

- We live in a mobile electronic world where each day we “plug in” and charge our electronic devices and equipment.
- Develop a model for the resulting costs of the increased demands and energy use of charging our electronic devices in public places.
- Who pays for the charging of electronic items such as phones, computers, and electric vehicles at public places?

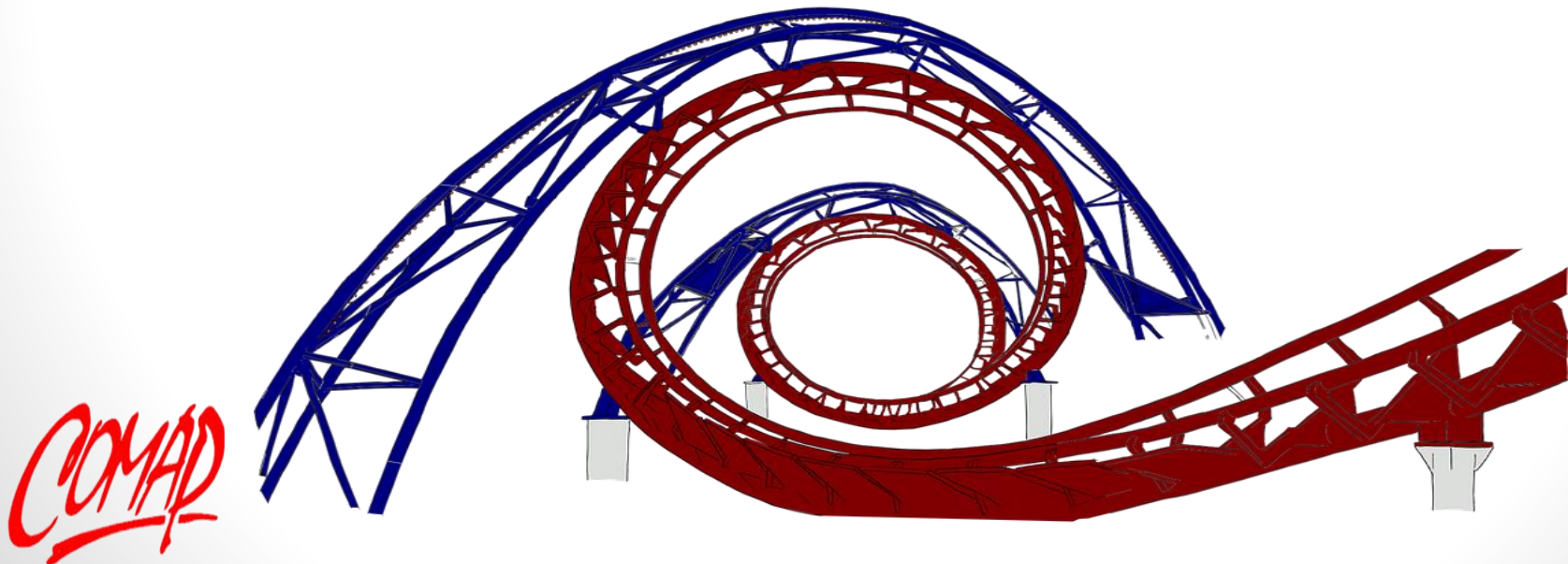
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Example Problem

Roller Coasters

- There are many Roller Coaster rating/ranking systems on line that take subjective rider input into account.
- Create a purely objective and quantitative algorithm to develop a roller coaster rating/ranking system.
- Develop your “Top 10 in The World” roller coaster list.



Resources – at www.COMAP.com

MathModels.org

Free Materials:

GAIMME Report – COMAP & SIAM

BioMath

PS-Future

Financial Mathematics

Consortium

