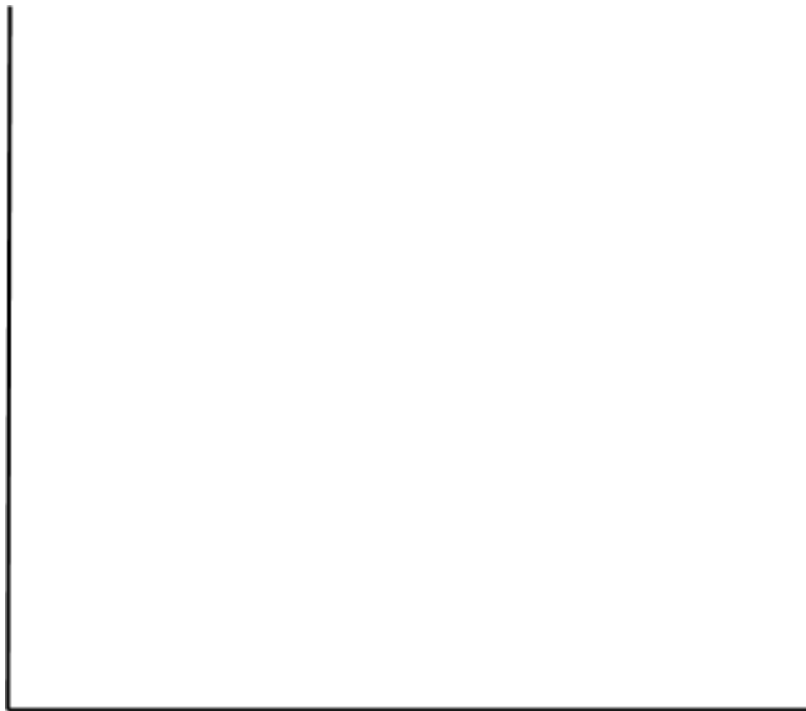# Basics of Math Models in Public Health

Taught by Jen Dillon
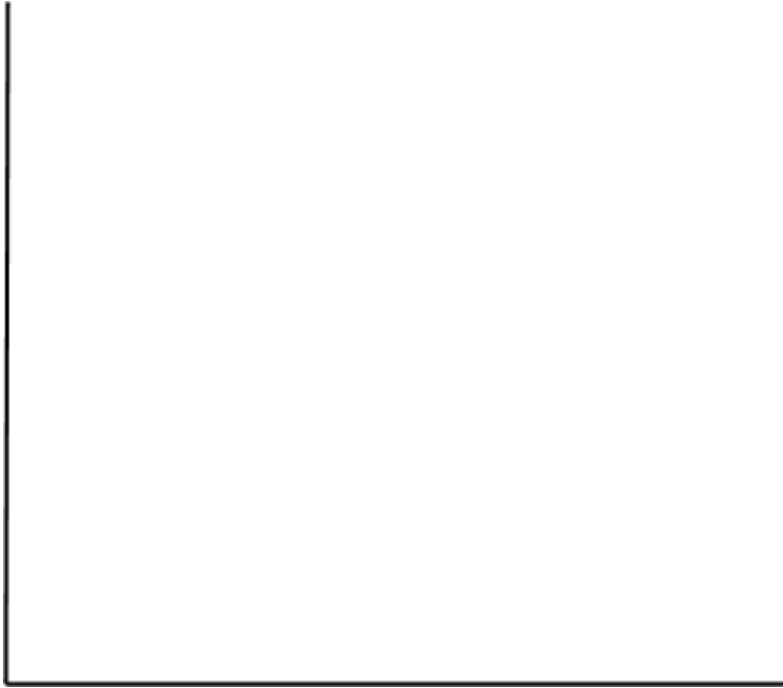
You will get the most out of this by taking notes as we go.

What modeling methods do we already understand, even if we didn't know that we did?

Linear

Exponential

You can enter this data in your TI calculator in lists 1 and 2:

L1: Time in days starting at March 1: 0, 14, 24 ,26, 27 ,32 ,38
L2: deaths so far: 1 , 69, 1028 ,1697, 2222, 6081 ,14788

Your calculator can do a scatterplot (in StatPlot) (try ZoomStat if your graph isn't appearing) and it can do a regression (in Stat → calc). See if you get the same values as we do. (Remember, y is not linearly related to x -- the ln of y is!)
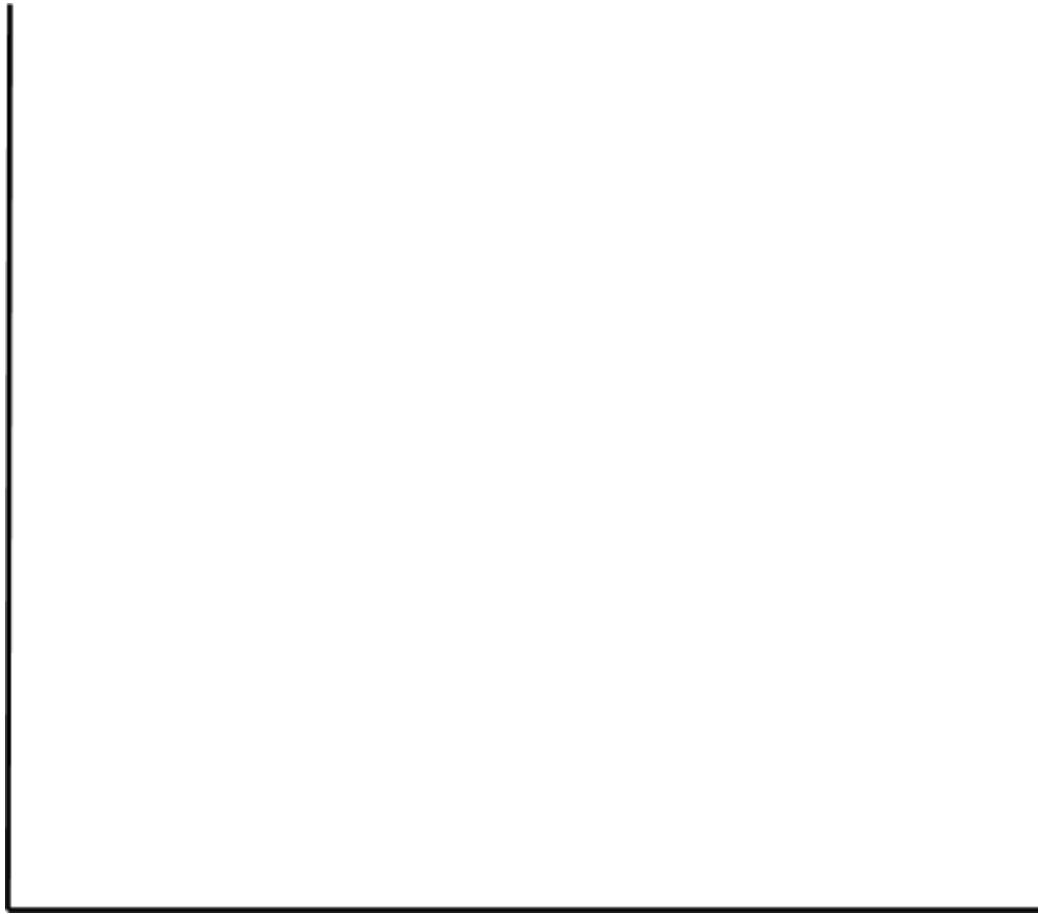
How do epidemiologists/mathematicians model situations like Covid 19?

The SIR Model

Three simultaneous differential equations	R naught (come back after graphs)

Graphing the SIR model solutions

Note: Jen earned a master's degree in biostatistics from the T.H. Chan School of Public Health; before that, she was fortunate to learn SIR models and much more at MTBI led by Carlos Castillo Chavez at Cornell, one of many National Science Foundation REU programs (undergraduate math and science majors should research such opportunities! It's a wonderful nation-wide program!). Her classmate from that summer, Paul Hurtado, now a professor of Mathematics and Statistics at University of Nevada Reno, helped her review SIR models this week to attempt to teach them to you!