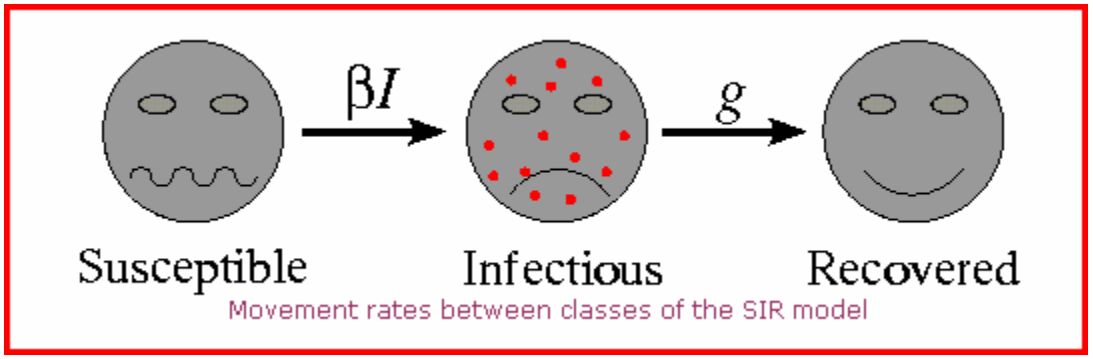
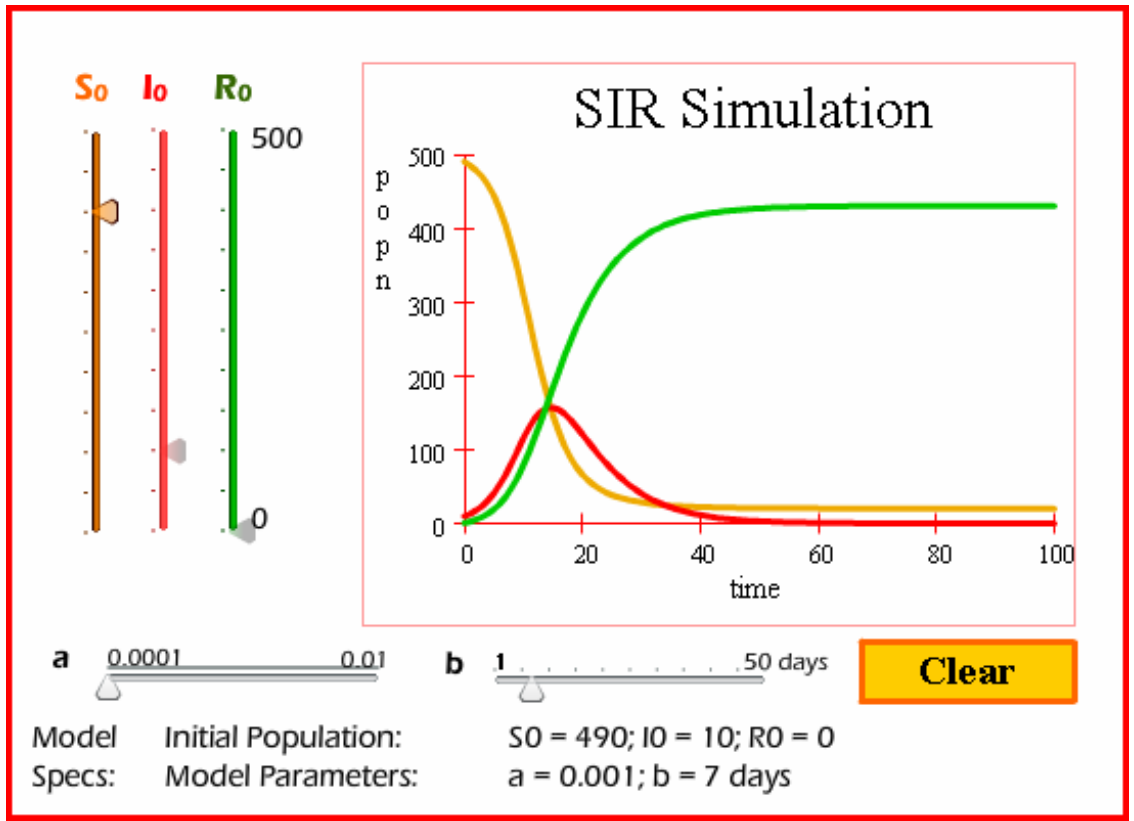
Why build a database?

An example: Teaching the SIR model





- MathBench, Univ of MD
  - SIR module
- Ellenmeyer and Burke, Kennesaw State Univ
  - Pre-calculus
  - Differential Calculus
  - Differential Equations
- ESTEEM
  - Weisstein, Truman State Univ.

	Pages of explanatory material	Interactivity	Instructor Prep Time	Model complexity
MathBench	>25	Flash-based	+	5 variables
KSU - Precalc	2	none	+++	2 variables
KSU – Calc	2	none	+++	calculus
KSU – Diff. Equ	2	none	+++	diff. equ.
ESTEEM	5	spreadsheet	++	27 variables

What do you want to teach?
How do you want to teach it? Lecture? Small group activity?
What kind of experience will the students have?
What resources are available to you?

Result 1: Resource List

- www.mathbench.umd.edu
  - click on Sabertooth Resources
- What we looked for:
  - calculus
  - probability
  - modelling
  - matrices

Series	# of resources	Inter-activity	Topics/Style/Level
CCP (Connected Curriculum Project, Duke)	8	--	Population Ecology / Calculus & Lin. Algebra
PostCALC (Duke)	5	--	Population Ecology / Calculus +
KSU	4	--	Epidemiology / Calculus +
MathBench (MD)	~30	Flash	Intro Biology / Precalculus
Java for Probability	9	Java	Probability / Algebra
Lou Gross	~50	--	Intro Biology / Various
BioQUEST	>100	Varies	Various / Various
ESTEEM	~40	Spread-sheet	Various / Various

Database	Subject Areas	Hits for "Epidemiology"	Relevant Hits for "SIR model"
MERLOT	Arts & Sciences (peer-reviewed, sort of)	28	2
BEN	Biology	116 (many images, lesson plans)	1 (ESTEEM)
CauseWeb	Statistics	13	0
NCTM Illuminations	Math	29 (grades 6-12)	0
OER (Open Education Rsrc)	Arts & Sciences	74 (mostly podcasts)	1 (ESTEEM)
MathWorld (Wolfram)	Math using mathematica	2	2
Google	Arts & Sciences & Britney Spears	21 million	15,900

An ideal database

- Well-chosen, complete resources
- Searchable/sortable on a variety of characteristics
- Ratings

Search / sort by …

- keywords (biology AND math)
- mathematical level
- format
- pedagogical style
- interactivity
- instructor prep time
- student completion time
- availability of assessment tools

Ratings

- Biology
- Mathematics

*****	extended investigation
****	problem-based
***	example with background info
**	example only OR theory only
*	brief mention

Ratings: Ease of Use

*****	Adaptable by user
****	Useful in multiple scenarios
***	Easily Used / good orientation
**	Requires instructor input
*	Requires additional software / instructions

Ratings: Visual Appeal

*****	Professional-level design
****	Extensive graphical representation
***	Relevant graphics
**	Limited graphics
*	Text only

Databases/Collections/Repositories

Video
- ted.com
- teachertube.com

Resources
- mathmodels.org
- joma.org (Journal of Online Mathematics and its Applications)
- cellbioed.org (Cell Biology Education)

Web 2.0
- Collaboratories (http://www.pnl.gov/biology/)
- Scholarpedia

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