



Developing, Researching, and Scaling Up SmartGraphs

December 2, 2010

Carolyn Staudt, PI
Andy Zucker, co-PI
The Concord Consortium
www.concord.org/smartgraphs



This material is based upon work supported by the National Science Foundation under Grant No. DRL-0918522. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Two-minute movie overview

www.concord.org/smartgraphs

Our Mission

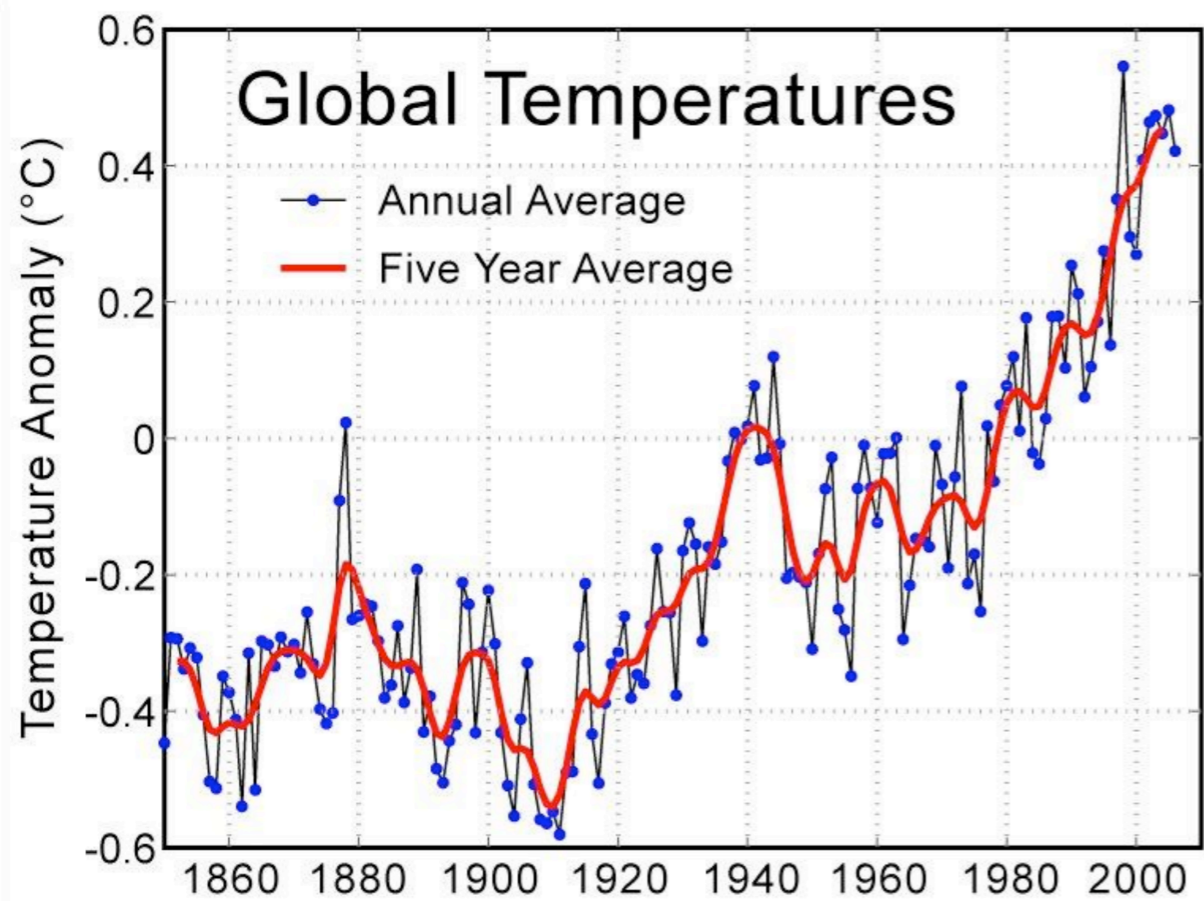
To develop, test, and scale up interactive *objects* and *activities* that are:

- open source
- browser-based
- authorable by teachers

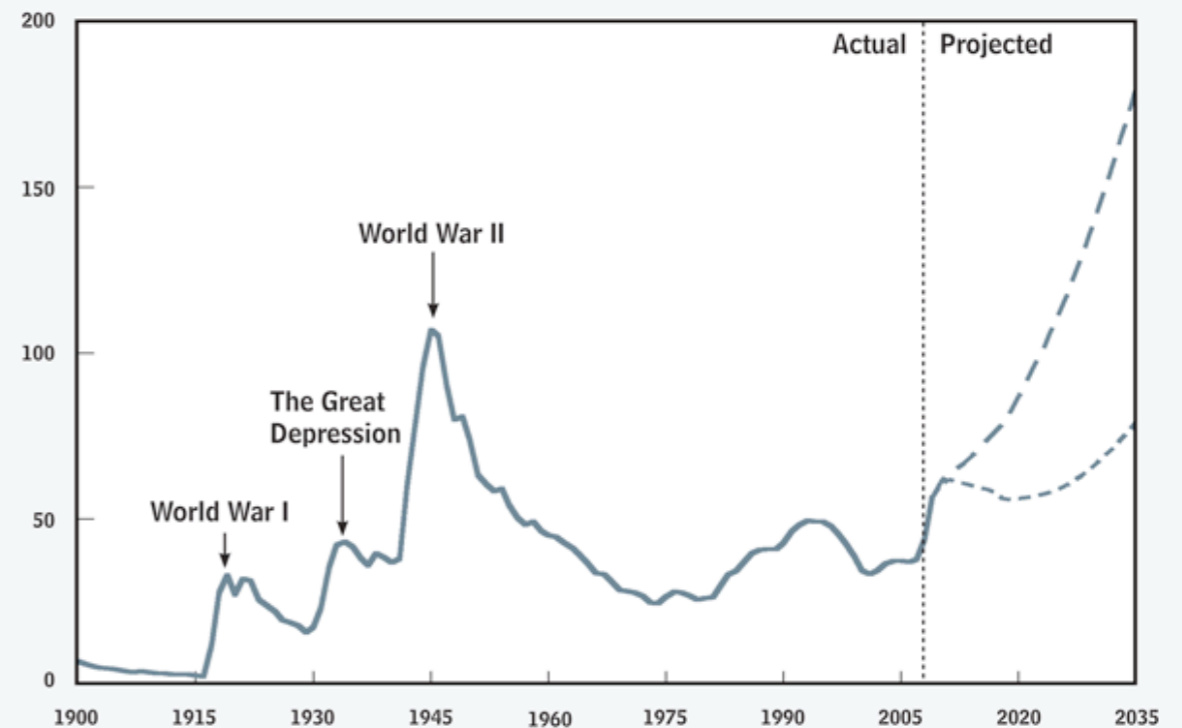
Accept inputs from:

- students' responses (point-and-click or multiple-choice)
- sketches
- probes
- functions
- models

Graphs are vital to all of us!



Percentage of Gross Domestic Product




Federal Debt Held by the Public
Under CBO's Two Budget Scenarios


Origin of SmartGraphs

Universal Design for Learning (UDL) project
Grades 3-6 science activities
Scaffolds student learning, as needed
Prepares students for data collection and display


How do light bulbs work? Options

4

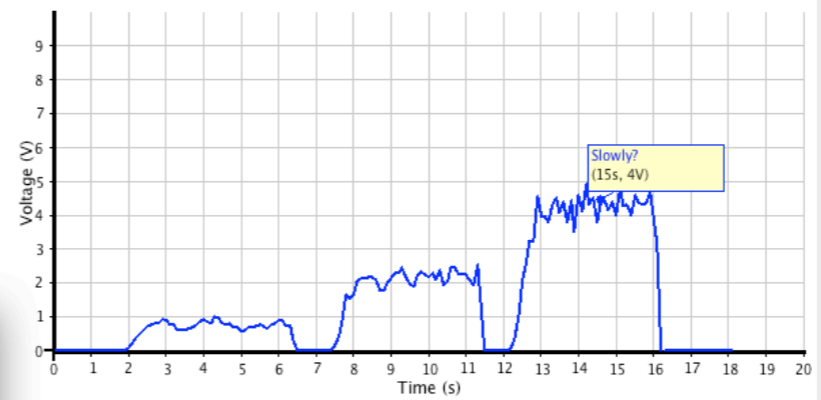
Add a label to the graph where Susan was cranking slowly. Use the label tool  on the right.









Message

 That's not correct. Add a label on the lowest hill.

light a bulb: sample data



Time (s)	Voltage (V)
0	0
2	0
3	1
4	1
5	1
6	1
7	0
8	2
9	2
10	2
11	2
12	0
13	4
14	4
15	4
16	4
17	0
18	0
19	0
20	0

Navigation icons:      

Design Principles

Help students learn the 'story' of the graph
Low barrier to entry for typical teachers (TPACK)
and students

- Easy to use
- Authoring is vital but also raises questions
- Scaling up is part of our mission

Include multiple representations of data

Use 'shape smartness'

Consider a 'projector mode'

Javascript and Sproutcore

Software can be hard to install & use in schools



Solution was long thought to be Java
Maturation of HTML5 and Javascript frameworks
offers another solution

School year 2010: Pilot SmartGraphs

- Local science and math teachers
- Pennsylvania science teachers

"I found that the hints for incorrect answers and instantaneous feedback for questions was terrific. When I do these types of activities on my own, I find a lot of my time is devoted to guiding students to a logical answer. The instantaneous feedback allowed the students to check what they had done wrong without having to ask for assistance."

School years 2011 and 2012: Summative research

- Randomized experimental trial

Creative Tensions

Resources compared to features
Open source versus proprietary
Use of motion sensors in research



The End

smartgraphs@concord.org