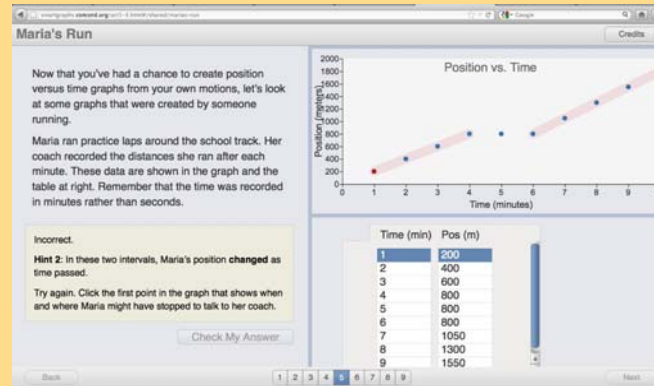# Developing, Researching, and Scaling Up SmartGraphs

SmartGraphs

Carolyn Staudt (PI), Andrew Zucker (Co-PI)
The Concord Consortium • Concord • MA 01742

Students interact with a graph on the computer screen to understand the meaning of the graph.

- Validated by research
- Useful throughout STEM Education
- Lesson format, each with multiple pages
- Modify existing activities or create new ones

Maria's Run

Now that you've had a chance to create position versus time graphs from your own motions, let's look at some graphs that were created by someone running.

Maria ran practice laps around the school track. Her coach recorded the distances she ran after each minute. These data are shown in the graph and the table at right. Remember that the time was recorded in minutes rather than seconds.

Incorrect.

Hint 2: In these two intervals, Maria's position **changed** as time passed.

Try again. Click the first point in the graph that shows when and where Maria might have stopped to talk to her coach.

Check My Answer

Time (min)	Pos (m)
1	200
2	400
3	600
4	800
5	800
6	800
7	1050
8	1300
9	1550

Research Question 1: What do teachers using SmartGraphs physical science activities report about using the software?

Findings: Based on 203 sessions when the 18 experimental teachers used a SmartGraphs activity with a class:

- More than 98% of the time teachers agreed or strongly agreed that the activities addressed important learning goals and helped students meet those goals.

- In 99% of the sessions, teachers reported they would use the activity again, either as is or with minor changes.

Research Question 2: Do students who use SmartGraphs activities learn more than comparison students studying the same topic from the same textbooks who do not use SmartGraphs activities?

Findings: The experimental students showed greater gains than the control students on three measures: multiple-choice items, open-response items, and the total score (see table below). In each case, the results were statistically significant.

Gain Scores from Pre to Post Test

	Experimental	Control	p-value
Total Gain	5.07	4.30	.008
Multiple-choice	1.16	1.07	.049
Open-response	4.19	3.64	.043

n=1,686 students

"I would definitely integrate this lesson into my curriculum. I like how students were able to predict and then analyze their data."

"The activity was well designed and the visual component was vital as students were able to see the graph change in relation to their movement."

\- SmartGraphs teachers

Visit us: **concord.org/smartgraphs**

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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.