

## Lab: Damped Oscillations, Part Two

**This week is a continuation of last week's activity.**

You have been asked to design a metronome for a famous pianist, and you have decided to use a spring with a small mass attached, which will bounce up and down with the beat. Now, this metronome will only be useful if the *period* (or the time it takes for one full cycle) of an oscillation stays the same over a long enough time interval (at least for a three minute tune). When you let the spring oscillate for a long period of time, you observe that the amplitude gradually gets smaller. What about the period?



**Question:** *What happens to the period of a spring over time?*

This week you will focus on **data analysis**. Last week you took data to decide whether or not the period stayed the same. Today you're going to *prove* whether it does or doesn't. Your goal is to develop a strong, quantitative argument proving that either (a) the period stays the same, or (b) the period changes over time.

### Timetable

<b>I. Introduction:</b>	<b>10 min</b>	<b>Whole class</b>
<b>II. Brainstorming and Planning Meeting:</b>	<b>10 min</b>	<b>Groups of 4</b>
<b>III. Carrying out the Experiment</b>	<b>40 min</b>	<b>Groups of 4</b>
<b>IV. Class Discussion</b>	<b>30 min</b>	<b>Whole Class</b>
<b>V. Evaluate and Reconsider:</b>	<b>15 min</b>	<b>Groups of 4</b>

#### **TIPS:**

- *For the discussion, try to get them to focus on the features of their graph that matter, and see if you can emphasize what people are disagreeing about. This can start a good conversation.*
- *Have the students look back at Labs 1 and 2 ("Dealing with data," parts 1 and 2) and examine the extent to which they're meeting the criteria set out there. Examine your own rubric for grading that pair of labs and use that to direct student attention in this lab.*