

Lab: Damped Oscillations, Part One

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: *Does the period of a spring stay the same over time?*

EQUIPMENT: An assortment of springs, things to hang springs from (such as ring stands), an assortment of masses to hang from the springs, string, tape, scissors, clamps, stopwatches.

Timetable

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

TIPS:

- *Ask the students to call you over to OK their experiment before they start taking data. Make sure that the experiment they propose will answer the question.*
- *Ask the groups how much data they are planning to take, and whether it will be enough to see the relationship between period and time.*
- *There are many different ways to design this experiment. Encourage creativity and innovation, even at the expense of other things. It is important that they acquire confidence in the lab that their ideas are useful.*
- *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.*