

**Problem 5.A:** Phun exercise: Download and open the Phun scene at [http://web.njit.edu/~gary/430/oscillating\\_box.phz](http://web.njit.edu/~gary/430/oscillating_box.phz). Then do the following:

- Open the simulation info window from the File menu.
  - Start the simulation running, and watch the oscillation of the box.
  - Click the pause button (green “run” arrow) at a point where the box is at one of its extreme angles. It helps to zoom in. If you miss the moment of extreme angle, just try again.
  - When you have it paused at an extreme angle, note the simulation time,  $t_o$ .
  - Now start the simulation and count exactly 10 oscillations, then pause it at the same extreme angle as your initial angle. The new simulation time is then 10 periods after the start time  $t_o$ .
- a) Determine the observed period from your times.
- b) Slide 4 of lecture 11 gives the equivalent “ $k$ ” value for this problem. Use it to get an expression for the period of oscillation,  $\tau$ , in terms of  $g$ ,  $r$  and  $b$ .
- c) Determine  $r$  and  $b$  from the Phun objects using their areas (you’ll need the object information window for each object). Using  $r$  and  $b$  in your expression from part  $b$ , calculate the period of oscillation and compare with your measured time from part  $a$ . You should get within 10% or so of the measured period.