Additional Exercises

A-1: Mr. Knote, a piano tuner, taps his 440-Hz tuning fork with a mallet. What is the period of the vibrating tuning fork?

A-2: Denny jumps up and down on his bed, taking 0.75 s for each jump. What is the frequency of Denny's jumping?

A-3: Inside most ball-point pens is a small spring that compresses as the pen is pressed against the paper. If a force of 0.1 N compresses the pen's spring a distance of 0.005 m, what is the force constant of the tiny spring?

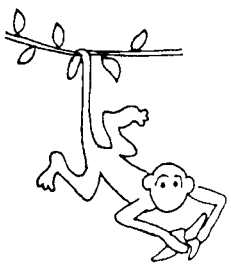
A-4: Maureen is trying to predict the period of a mass hung on a spring. She has a spring of negligible mass and four weights to hang on the end. Maureen collects the following data as she observes the stretch of the spring:

force (N)	displacement (m)
2.5	0.050
5.0	0.102
7.5	0.149
10.0	0.199

a) Plot a graph of force (on the *y*-axis) vs. displacement (on the *x*-axis). b) Find the slope of the graph. What does this slope represent? c) Use the information you have obtained to find the period of the spring when a 3.0 kg mass is hung on the end.

A-5: Kim drives her empty dump truck over a berm (also called a speed bump) at the construction site. The truck has a mass of 3000. kg and the force constant for one of the truck's springs is 100 000. N/m. (Remember, the truck has 4 wheels.) a) What is the resulting period of the bouncing truck as it goes over the bump? b) If Kim leaves the construction site with a load of dirt in her truck, what will this do to the period of her dump truck as it crosses the berm?

A-6: A monkey swings from a jungle vine by his 0.30-m-long tail. a) What is the period of swing of the monkey? b) With what frequency does the monkey swing?



A-7: A wrecking ball used to demolish buildings swings from a 10.0-m-long cable. What is the period of the wrecking ball as it swings?

A-8: A crow attempts to land on a small bird feeder, causing it to swing back and forth with a frequency of 0.350 Hz. How long is the wire from which the feeder hangs?

A-9: The acceleration due to gravity on the moon is 1/6 that on Earth. a) If you wanted a pendulum clock to tell time on the moon the same as it does on Earth (i.e., have the same period), would you need to lengthen or shorten the pendulum? b) If the pendulum was originally 24.0 cm long on Earth, how long should it be on the moon?

A1. 0.0023 s
A3. 20 N/m
A5. a) 0.5441 s
A7. 6.28 s
A9. b) 0.0400 m