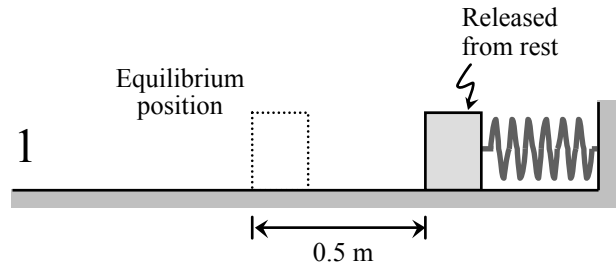
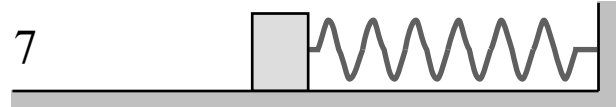
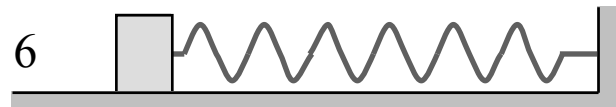
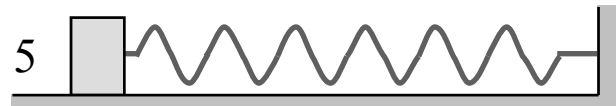
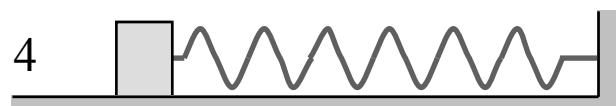
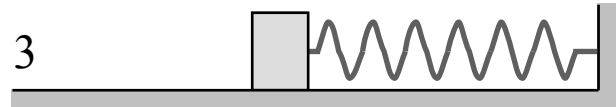


1. A spring is used to connect a block to a wall. (Neglect the mass of the spring, and assume the surface is frictionless.)

A student moves the block 0.5 m to the right of its equilibrium position and at a certain instant (instant 1) releases it from rest. The subsequent motion of the block is shown. (The diagrams show the position of the block at time intervals 0.1 s apart.)



- a. What is the period of motion of the block? Explain how you can tell.



- b. Suppose that the student repeated the experiment shown here, except with one change to the setup.

For each change listed below, how (if at all) would that change affect the period of motion? Be as specific as possible in your answers. Explain your reasoning.

- The block is released 0.3 m to the right of equilibrium.

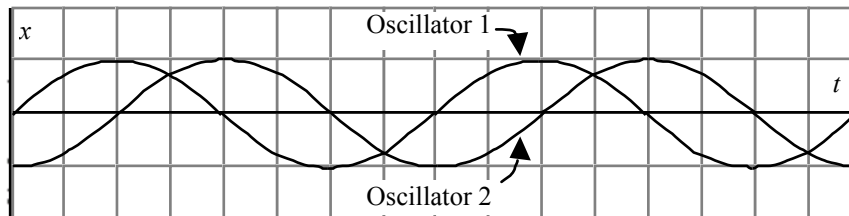
- The spring is replaced with a stiffer spring.

- The block is replaced with another block with four times the mass as the original one.

(Continued on other side)

Pretest: Simple harmonic motion

2. Two simple harmonic oscillators (1 and 2) move with equal amplitudes and equal frequencies, as illustrated in the x vs. t graph provided.



- a. What is the phase difference between the motions of oscillator 1 and oscillator 2? (Express your answer as a number of degrees not larger than 180° , or as a number of radians not larger than π .) Explain how you can tell.
- b. Is oscillator 2 *ahead of* or *behind* oscillator 1 by the amount you specified in part a above? Explain how you can tell.