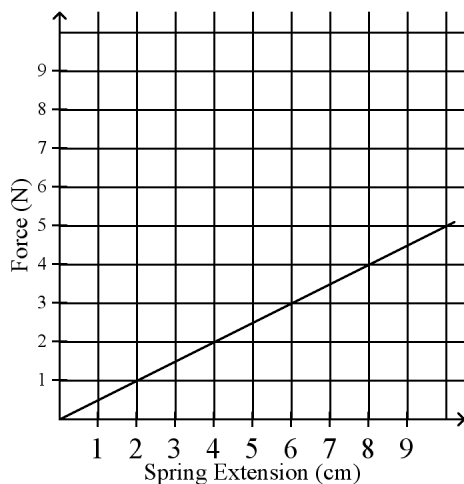


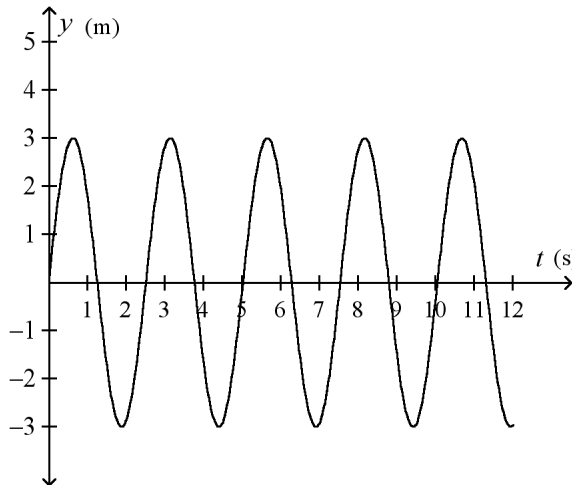
Chapter 14 Problems: Vibrations and Waves**Problem**

1. A pendulum with a length of 0.600 m has a period of 1.55 s. What is the acceleration due to gravity at the pendulum's location?
2. A lifeguard on a beach observes that waves have a speed of 2.60 m/s and a distance of 2.50 m between wave crests. What is the period of the wave motion?
3. Spring A with a spring constant of 279 N/m is stretched by a distance of 18.0 cm when a block is suspended from its end. An object is suspended from another spring B with a spring constant of 145 N/m. If the elastic potential energy in both the springs is the same, how far does spring B stretch?
4. A spring is subjected to a stretching force. The following graph shows the variation of the force with the extension produced in the spring. Calculate the increase in the potential energy of the spring when the extension increases from 1.7 cm to 3.3 cm.

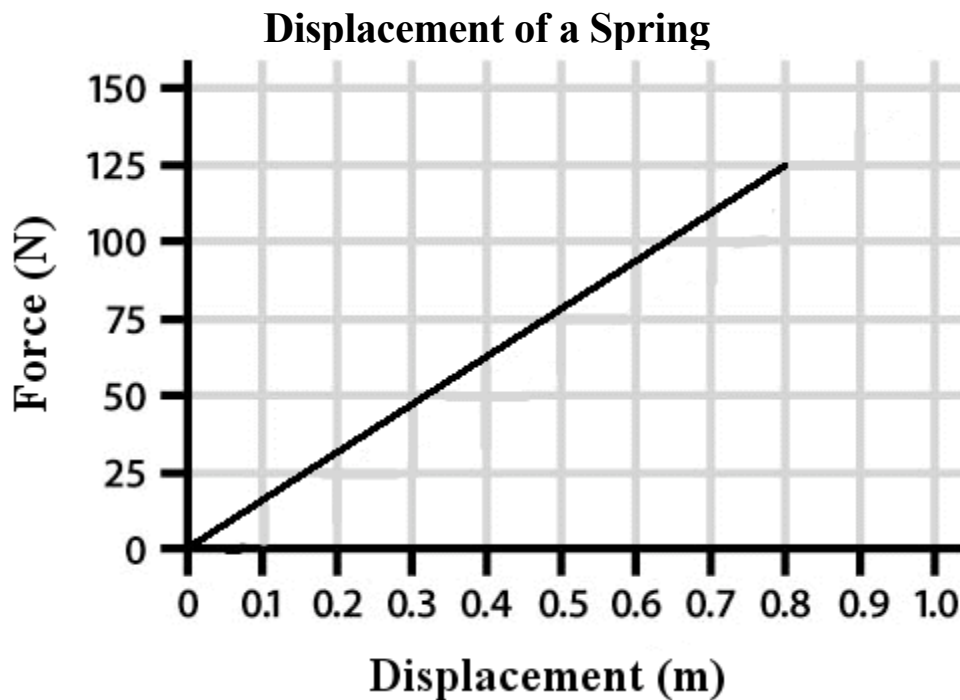


5. A spring extends to 1.20 times its unstretched length when a force of 8.50 N is applied. Assuming Hooke's law applies to the spring, calculate the percent increase in the potential energy stored in the spring if the force is increased further and its length becomes 2.40 times its unstretched length.
6. Calculate the percent change in the time period of a simple pendulum when its length changes by a factor of 1.1 and the acceleration due to gravity changes by a factor of 1.2.

7. The graph below displays how displacement varies with time when a wave passes a fixed point at a speed of 12.0 m/s. Calculate the frequency and wavelength of the wave.



8. A spring stretches by 24 cm when a block is suspended from its end. The elastic potential energy stored in the spring is 5.4 J when it is stretched this far. Find the weight of the block.



9. The displacement of a spring when different amounts of force are applied is shown in this graph. What is the spring constant of this spring?
10. How much potential energy is stored in the spring if it is displaced 0.6 m?
11. A spring has 54,000 J of elastic potential energy stored when it is stretched out. If its spring constant is 285 N/m, how much has the spring been stretched?
12. How long must a pendulum be to have a period of 4.7 seconds?