

Name:

Date:

Period:

Unit 08 Review (Simple Harmonic Motion & Waves)

$$T_P = 2\pi\sqrt{\frac{\ell}{g}} \quad T_S = 2\pi\sqrt{\frac{m}{k}} \quad F_P = -mg\theta \quad F_S = -kd \quad F_G = mg \quad v = f\lambda$$

1. You are floating in the ocean. The waves have an amplitude of 1.5 meters. The frequency with which you bob up and down is 0.2 Hz. How far apart are the waves if they are traveling at 3 m/s?
2. A 0.3-kg mass is attached to a vertical spring. When the mass is attached, the spring stretches by 0.15 m. Calculate the spring constant of the spring.
3. Calculate the period and frequency of a pendulum with length 1.4 m.
4. A spring makes 9 oscillations in 15 s. The spring constant is 80 N/m. What mass is on the spring?

Answers: (1) $\lambda = 15 \text{ m}$ (2) $k = 19.6 \text{ N/m}$ (3) $T = 2.37 \text{ s}; f = 0.42 \text{ Hz}$ (4) $m = 5.67 \text{ kg}$

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5. What are the four equations you need to have memorized?
6. Define the following:
 - (a) amplitude
 - (b) equilibrium
 - (c) frequency
 - (d) longitudinal wave
 - (e) medium
 - (f) period
 - (g) restoring force
 - (h) spring constant
 - (i) transverse wave
 - (j) wavelength
7. Explain why an oscillator keeps moving when it gets to equilibrium, even though the net force there is zero.
8. Why doesn't amplitude affect period?
9. What two factors affect the period of a spring? What two factors affect the period of a pendulum?
10. What do waves transport and what do they not transport?
11. Draw an example of constructive and destructive interference. Label each.
12. What is the only thing you can do to change the speed of a wave?
13. How are frequency and wavelength related?