Describing Waves

Read from **Lesson 2** of the **Waves** chapter at **The Physics Classroom:**

> **http://www.physicsclassroom.com/Class/waves/u10l2a.html**
> **http://www.physicsclassroom.com/Class/waves/u10l2b.html**
> **http://www.physicsclassroom.com/Class/waves/u10l2c.html**
> **http://www.physicsclassroom.com/Class/waves/u10l2d.html**

MOP Connection: Waves: sublevels 2 and 3

1. A wave is introduced into a medium and a snapshot of the medium at a particular instant in time is shown at the right. Several positions along the medium are labeled. Categorize the positions as either crests or troughs.
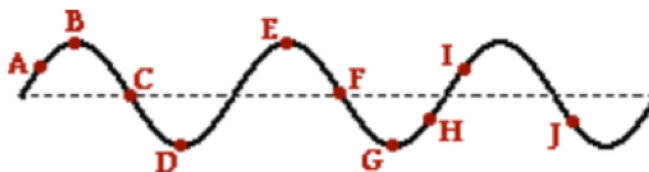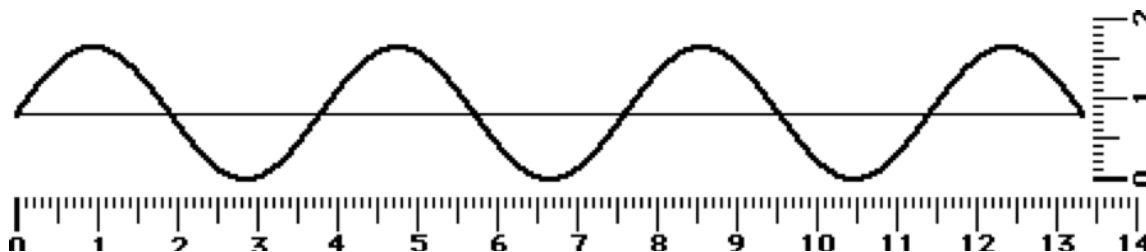
    Crests: _____   Troughs: _____   Neither: _____

2. The wavelength of the wave in the diagram below is given by letter _____ and the amplitude of the wave in the diagram below is given by letter _____.
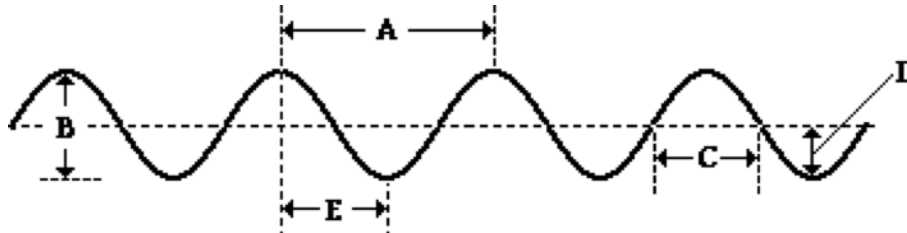
3. A sine curve that represents a transverse wave is drawn below. Use the centimeter ruler to measure the wavelength and amplitude of the wave (show units).

    a. Wavelength = _____   b. Amplitude = _____

4. The number of cycles of a periodic wave per unit time is called the wave's _____.

5. Any repeated and periodic motion can be described by a frequency. For instance, the frequency of rotation of a second hand on a clock is _____.
    a. $1/60$ Hz   b. $1/12$ Hz   c. $1/2$ Hz   d. 1 Hz   e. 60 Hz

6. A pendulum makes 40 vibrations in 20 seconds. Calculate its period?

   > Throughout this unit, internalize the meaning of terms such as period, frequency, wavelength and speed. Utilize the meaning of these terms to answer conceptual questions; avoid *formula fixation*.
   >
   > **TIP**

Wave Basics

7. Olive Udadi accompanies her father to the park for an afternoon of fun. While there, she hops on the swing and begins a motion characterized by a complete back-and-forth cycle every 5.0 seconds. This statement provides info about the child's _____.
    a. speed   b. frequency   c. period

8. The frequency of Olive's periodic motion (in #7) is _____.
    a. 0.20 Hz   b. 0.40 Hz   c. 2.5 Hz   d. 5.0 Hz

9. A period of 5.0 seconds corresponds to a frequency of _____ Hz.
    a. 0.20   b. 0.50   c. 0.020   d. 0.050   e. 0.0020

10. The period of a 261-Hertz sound wave is _____.

11. As the frequency of a wave increases, the period of the wave _____.
    a. decreases   b. increases   c. remains the same

12. The speed of a wave refers to
    a. how often it vibrates to and fro.
    b. how high it vibrates.
    c. how much time it takes to vibrate to and fro.
    d. how far a given point (e.g., a crest) on the wave travels per unit of time.

13. Write the two equations that can be used to determine the speed of a wave.

14. Mac and Tosh are resting on top of the water near the end of the pool when Mac creates a surface wave. The wave travels the length of the pool and back in 25 seconds. The pool is 25 meters long. Determine the speed of the wave. **PSYW**

15. A fisherman uses a sonic ranger to determine the depth of a lake. The sound waves travel at 1210 m/s through the water and require 0.020 seconds to travel to the lake's bottom and back to the boat. How deep is the lake? **PSYW**

16. The water waves below are traveling with a speed of 3.0 m/s and splashing periodically against the Wilbert's perch. Each adjacent crest is 6.0 meters apart and splashes Wilbert's feet upon reaching his perch. How much time passes between each successive drenching? _____Answer and explain using complete sentences or a calculation.

6.0 m

v=3.0 m/s