Name:_____Date:_____Class:_____Assi. #:_____

Wave Speed

WORKSHEET 25

Sample Problem:
The musical note A above middle C has a frequency of 440 Hz. If the speed of sound is known to be 350 m/s, what is the wavelength of this note?

1. List the given and unknown values.

Given: *frequency*, f = 440 Hz
wave speed, v = 350 m/s
Unknown: *wavelength*, λ = ? m

2. Write the equation for wave speed, and rearrange it to solve for wavelength.

$v = f \times \lambda$
$\lambda = v / f$
$f = v / \lambda$

3. Insert the known values into the equation, and solve.
$\lambda = v / f$
λ = 350 m/s / 440 Hz
λ = 0.80 m

Wavelength Practice Problems:

1. A dog whistle is designed to produce a sound with a frequency beyond that which can be heard by humans (between 20000 Hz and 27000 Hz). If a particular whistle produces a sound with a frequency of 25000Hz, what is the sound's wavelength? Assume the speed of sound in air is 331 m/s.

2. The lowest pitch that the average human can hear has a frequency of 20.0 Hz. If sound with this frequency travels through air with a speed of 331 m/s, what is its wavelength?

3. A 10.0 m wire is hung from a high ceiling and held tightly below by a large mass. Standing waves are created in the wire by air currents that pass over the wire, setting it in motion. If the speed of the standing wave is 335 m/s and its frequency is 67 Hz, what is its wavelength?

Frequency Practice Problems:

4. Cicadas produce a buzzing sound that has a wavelength in air of 2.69 m. If the speed of sound in air is 346 m/s, what is the frequency of the sound produced by a cicada?

5. A drum is struck, producing a wave with a wavelength of 1.10 m and a speed of 24200 m/s. What is the frequency of the wave?

6. One of the largest organ pipes is in the auditorium organ in the convention hall in Atlantic City, New Jersey. The pipe is 38.6 ft long and produces a sound with a wavelength of about 10.6 m. If the speed of sound in air is 346 m/s, what is the frequency of this sound?

Wave Speed Practice Problems:

7. A wave with a frequency of 60.0 Hz travels through vulcanized rubber with a wavelength of 0.90 m. What is the speed of this wave?

8. A wave with a frequency of 60.0 Hz travels through steel with a wavelength of 85.5 m. What is the speed of this wave?