

## Chapter 26 Sound

**Relating Properties of Sound**

A musical note has a frequency of 264 Hz. What is the wavelength of the sound if it moves with a speed of 345 m/s?

**1. Read and Understand**

*What information are you given?*

speed of the sound wave =  $v = 345$  m/s

frequency of the sound wave =  $f = 264$  Hz

**2. Plan and Solve**

*What unknown are you trying to calculate?*

wavelength =  $\lambda$

*What relationship can you use to find the unknown?*

wave speed = wavelength  $\times$  frequency:  $v = \lambda f$

*Rearrange the equation to solve for the unknown variable.*

$$\lambda = \frac{v}{f}$$

*Replace each variable with its known value.*

$$\lambda = \frac{345 \text{ m/s}}{264 \text{ Hz}} = 1.3 \text{ m}$$

**3. Look Back and Check**

*Is your answer reasonable?*

A speed of 345 m/s indicates that the medium through which the sound is traveling is probably air. A sound with a frequency of 264 Hz is an audible sound. The wavelength of 1.3 m is reasonable for an audible sound traveling through air.

**Math Practice**

*On a separate sheet of paper, solve the following problems.*

1. A dolphin emits a sound with a frequency of  $1.2 \times 10^5$  Hz. What is the wavelength of this sound as it moves through seawater with a speed of 1530 m/s?
2. Sound with a wavelength of 5.8 m moves through a material at a speed of 1508 m/s. What is the frequency of the sound?
3. Sound with a frequency of 468 Hz and a wavelength of 4.7 m moves through a material. What is the speed of the sound?