

2/25/13

Name _____

Skills Worksheet

Math Skills**Wave Speed**

After you study each sample problem and solution, work out the practice problems on a separate sheet of paper. Write your answers in the spaces provided.

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?

SOLUTION

Step 1: List the given and unknown values.

Given: frequency, $f = 440$ Hz
wave speed, $v = 350$ m/s

Unknown: wavelength, $\lambda = ?$ m

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

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

Step 3: Insert the known values into the equation, and solve.

$$\lambda = \frac{350 \text{ m/s}}{440 \text{ Hz}}$$

$$\lambda = 0.80 \text{ m}$$

PRACTICE

1. A certain FM radio station broadcasts electromagnetic waves at a frequency of 9.05×10^7 Hz. These radio waves travel at a speed of 3.00×10^8 m/s. What is the wavelength of these radio waves?

$$\frac{3.00 \times 10^8 \text{ m/s}}{9.05 \times 10^7 \text{ Hz}} = \lambda \quad \lambda = 3.31 \text{ m}$$

2. A dog whistle is designed to produce a sound with a frequency beyond that which can be heard by humans (between 20,000 Hz and 27,000 Hz). If a particular whistle produces a sound with a frequency of 2.5×10^4 Hz, what is the sound's wavelength? Assume the speed of sound in air is 331 m/s.

$$v = f \lambda$$

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

$$f = 9.05 \times 10^7 \text{ Hz}$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$\lambda = ?$$