

Name: _____

Date: _____

MCHS Honors Physics 2013-2014

Simple Harmonic Motion 2

Remember: $v = f\lambda$. That is, the VELOCITY (v) is equal to the FREQUENCY (f) times the WAVELENGTH (λ).

PROBLEMS:

1. Sound waves are longitudinal waves in air. The speed of sound depends on temperature; at 20°C it is 344 m/s (1130 ft/s²). What is the wavelength of a sound wave in air at 20°C if the frequency is 262 Hz (the approximate frequency of middle C on a piano)?
2. The speed of all electromagnetic waves in empty space is $3.00 \times 10^8 \text{ m/s}$ (the "speed of light"). Calculate the wavelength of electromagnetic waves emitted at the following frequencies:
 - a. Radio waves at 88.0 MHz
 - b. Visible light at 6.0×10^{12} MHz
 - c. X-Rays at 3.0×10^{12} MHz
3. A tuning fork produces a sound with a frequency of 256 MHz and a wavelength in air of 1.35 meters.
 - a. In these conditions, what is the speed of sound in air?
 - b. What would be the wavelength of this same sound in water, given that the speed of sound in water is 1500 m/s?