Today:	**16** Waves & Sound 2nd 1/3	HW1 redo,	HW3
Wednesday:	**16** Waves & Sound 3rd 1/3	HW2 redo,	HW4
Lab:	**Lab1**: Harmonic Motion		

16.1   The nature of sound
Longitudinal vs. Transverse wave
- **The medium: Air**
- **The wave: density disturbances**
    - **Compression – rarefaction wave**
- **Disturbance fronts travel, the medium does not.**
- **Familiar Plot**
    - **Pure Tone**
- **Perceived Properties**
    - **Pitch**
        - **Infrasonic**
        - **Ultrasonic**
    - **Loudness**

Longitudinal Wave
        Sound fronts
                Properties to watch: Density, Tension, Position

Speed of Sound
- **Wavelength-period dependence**
- **Medium property dependence**
- **Examples problem just using this equation.**

Ex.1 Given the speed of sound in air at room temperature (20 C = 293 K) is 343 m/s, what would be the speed of sound in air at body temperature (310 K)?

Ex2: What would be the speed of sound at body temperature 37 C (310 K) in He? (Note: He is monatomic.)

- **Sonar**
- **Sound through Liquids, Through Solids**

HW 4

34.   The wavelength of a sound wave in air is 2.74 m at 20°C/ What is the wavelength of this sound wave in fresh water at 20°C? *Hint: The frequency of the sound is the same in both media.)*

---

36. Consult Interactive LearningWare 16.1 at www.wiley.com/college/cutnell (edition 6)for insight into this problem. At what temperature is the speed of sound in helium (ideal gas, $\gamma =$ 1.67, atomic mass = 4.003 u) the same as its speed in oxygen at 0°C?

---

42. A sound wave travels twice as far in neon (Ne) as it does in krypton (Kr) in the same time interval. Both neon and krypton can be treated as monatomic ideal gases. The atomic mass of neon is 20.2 u, and that of krypton is 83.8 u. The temperature of the krypton is 293 K. What is the temperature of the neon?