Sound Waves

Procedures: Go to http://www.colorado.edu/physics/phet and find the "Sound" sim.

Questions:

Listen to a Single Source:

1. Observe the sound waves coming from the speaker.
    a) What do the dark and light bands represent? (Remember, sound waves are *longitudinal* waves.)
    b) Why do the waves get lighter with distance from the speaker?
    c) How does changing the frequency and amplitude affect the depiction of the sound waves in the sim?
    d) How do you think changing the frequency and amplitude affect the sound **heard** by the listener?

Measure:

2. Press "start" and move the ruler to the center of the speaker.
    a) Look at the stopwatch. What do you notice that is strange about it? Why is it programmed this way?
    b) Describe how you would find the frequency of a wave if the frequency slider did not have a number display. Test your idea with a variety of waves (record them in a data table) and describe how well your procedure gives results that match the frequency display.
    c) Describe how you would find the period of a wave without using the frequency information. Test your idea with a variety of waves and record your experiment in a data table. Check your method by calculating the period using the frequency ($T = 1/f$). Show calculations.
    d) Hit stop and reset, and measure the distance a wave travels in a certain amount of time. Make a data table and do at least 3 trials. Find the speed of sound using $v = d/t$.
    e) Use the ruler to measure the wavelength of this sound wave. Check the speed calculated above using $v = f\lambda$.

Two-Source Interference:

3. Observe the interference pattern made by the sound waves coming from two speakers.
    a) Sketch the pattern using shades of gray.
    b) Describe what is happening with the waves where you see white spots, dark spots, and gray spots. Draw some pictures of waves to help your explanation.