Investigating Sound

Today we are going to complete a lab investigating sound. We’ve already explored the ideas of wavelength, frequency, and amplitude but now we are going to see how they relate to our everyday experiences with sound.

Go to <http://tinyurl.com/soundwavesim> and “Run” the program.

1. **Frequency and Amplitude**
2. Choose the tab that says “listen to a single source.” Describe what you are seeing when you open the simulator. Remember that sound is a mechanical compressional/longitudinal wave. What do you think that the light and dark bands represent on the simulation?
   1. On the side adjust the frequency to all the way to the 980 Hz. Describe the changes that you see.
   2. Now move the frequency to 141 Hz. How does the wave that you are seeing change again?
   3. What conclusions can you make about the wave and frequency?
3. Now let’s do the same thing, but this time observe with our ears AND eyes. Reset the frequency to the original 505 Hz, and then check the box that says “Audio Enabled.”
   1. Move the frequency up to 980 Hz. How does the sound change?
   2. Now move it down to around 404 Hz. How does the sound change?
   3. Finally move the frequency to around 100 Hz. What happens to the sound now?
4. Based on what you have observed, write a conclusion that relates the frequency of a sound wave to what we see and hear on the simulator.



Teacher Initial \_\_\_\_\_\_\_ (25 points)

Next let’s look at the amplitude. Reset the frequency to 505 Hz and turn off the “audio enabled” audio control.

1. Move the amplitude slider all the way to the right. Record the changes that you see on the screen. How do you think that this might sound if we were listening to it?
2. Now move the slider almost all the way to the left and record the changes. What do you notice about the sound? What do you think will happen if you move the slider all the way to the left?

Now let’s try it with the sound ON. Click the “audio enabled” button and test out how the sound changes when you move the amplitude button left and right.

1. Based on your observations, write a conclusion that relates the amplitude to what we see and hear on the simulator.

Throughout the simulator, we have been making changes and listening using the perspective of the speaker. How do you think that our experience might change if we were observing using the listener’s perspective? Try it and record your observations.



Teacher Initial \_\_\_\_\_ (25 points)

Sound waves are compressional waves that require a medium to move. In fact, the medium is VERY important to the way that a sound wave moves. Let’s look at this in the simulator. Click on the tab that says “listen with varying air pressure.” Set the audio controls to “Audio Enabled – Listener.” Now click the box that says “Remove air from the box.” Record your observations.

What do you notice looking at the speaker? Click the Audio Enabled box to change in to the perspective of the speaker. Does this make a difference?

What do you think happened that caused the change in sound that you observed?

Now click “Add Air to the Box.” Record your observations.

Based on what you observed write a conclusion about the medium and sound waves.



Teacher Initial \_\_\_\_\_ (50 points)

TRY IT!!!

Click on either “Measure” or “Interference by Reflection” tabs. Design an experiment and record observations on either the wavelength or how a wave responds when it strikes a barrier.

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