Sound Waves Simulation Worksheet 6th Grade Science Mr. Vehslage

Name: Section:

Go to <u>http://phet.colorado.edu/new/simulations/sims.php?sim=Sound</u> and click "Run" to start the simulation.

- I. In the Sound Waves simulation, go to the Listen to a Single Source tab.
- If you notice in the far-right handed corner, under Frequency it says 500Hz. Hz?...we've never talked about that before. However, you already know what frequency means. Therefore, what do you think this unit called Hertz (Hz) means? What does 1 Hz represent?
- 2. What do the dark and light bands represent? (Remember, sound waves are *longitudinal* waves.)
- 3. Why do the waves get lighter with distance from the speaker?

Select the Audio enabled and 'Listener' features.

- 4. What happens when you move the man back and forth? Why?
- 5. What happens to the waves and the sound when you keep the amplitude constant but increase and decrease the frequency? Try and be as descriptive as possible.

- 6. What happens to the waves and the sound when you keep the frequency constant increase and decrease the amplitude? Be descriptive!
- 7. Is there a relationship between frequency and sound waves? If so, what is it?
- 8. Is there a relationship between amplitude and sound waves? If so, what is it?
- II Now go to the **Measure** tab.
- 1. How long does it take the sound waves to reach 5 meters?
- 2. Using the above information, calculate the speed of sound in m/s. *Remember, speed is the amount of distance traveled PER second.*
- 3. Increase the frequency to 900Hz. How long does it take the sound waves to reach 5 meters?
- 4. What is the speed of the wave now?
- 5. Decrease the frequency to 200Hz. How long does it take the sound waves to reach 5 meters?
- 6. What is the speed of the wave now?

- 7. Is there a relationship between frequency of the wave and its speed? If so, what is it?
- 8. Return the frequency back to 550Hz. Increase the amplitude of the wave.
 - a. What do you observe about the wave? Can you explain your observations?
 - b. How long does it take the sound waves to reach 5 meters?
 - c. What is the speed of the wave now?
- 9. With the frequency at 550Hz, decrease the amplitude of the wave.
 - a. What do you observe about the wave? Explain your observations.
 - b. How long does it take the sound waves to reach 5 meters?
 - c. What is the speed of the wave now?
- 10. Is there a relationship between amplitude of the wave and its speed? If so, what is it? If not, what does amplitude represent?

- III Go to Two Source Interference tab.
- 1) What happens when you move the man back and forth? Why?
- 2) What happens to the sound when there are two sources? Sketch the pattern using shades of gray (pencil is fine).

- 3) What type(s) of waves behaviors are you observing here?
- 4) What happens when you keep the amplitude constant but adjust (increase of decrease) the frequency of the two sources? *Move the person back and forth.*

5) Return the frequency back to 400Hz. What happens when you keep the frequency constant but adjust (increase of decrease) the amplitude of the two sources? *Move the person back and forth.*

- IV Go to Interference by Reflection tab.
- 1. Change the wall's angle and record your observations. Sketch the pattern BEFORE AND AFTER using shades of gray (pencil is fine).

Explain what is happening here.

2. Change the wall's position and record your observations. Sketch the pattern BEFORE AND AFTER using shades of gray (pencil is fine).

Explain what is happening here.

- V Go to Listen with Varying Air Pressure tab.
- 1. What can you hear when the pressure is at 1 atm?
- 2. Now remove the air from the box and record what happens.

3. What can you conclude about sound in a vacuum? Why do you think this happens?