

# Sound Waves Simulation

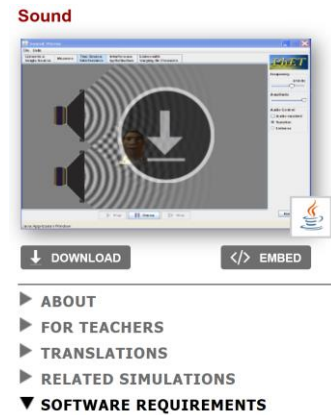
<http://phet.colorado.edu/en/simulation/sound>

**LAB REPORT:** Type or hand write the answers to the observations and questions in this lab report in a separate document. Convert your final document to a PDF and submit into your Google Drive Physics Shared Folder.

- Include the number of the question and then the answer, image, Data Table, etc.
- Save your final work as a PDF and save it to your Google Drive Physics Shared Folder.

## **TO BEGIN:**

- You must do this sim lab on a laptop.
- Click the link above or go to the PhET site at <http://phet.colorado.edu> and launch Sound
- FIRST - You most likely will need to install the latest version of Java for the simulation to work. In the list below the sim, click on "Software Requirements" and update the latest version of Java for your laptop. This app is safe for your computer.
- Download the Sound simulation



## **PART A:** LISTEN TO A SINGLE SOURCE

- Click the 'Listen to a Single Source' tab.
  - Make sure that "Audio Enabled" and "Listener" tabs are checked.
  - *Operating Note: If the sim seems to malfunction, try clicking the "Audio Enabled" tab off and back on.*
- Click the play arrow
  - 1) What do the dark and light bands represent? (Remember, sound waves are *longitudinal* waves.)
  - 2) Why do the waves get lighter with distance from the speaker?
  - 3) Change the frequency to higher and lower frequencies. What do you hear?
  - 4) Describe specifically how changing frequency affects the visual depiction of the sound waves in the sim.
  - 5) Change the amplitude to higher and lower amplitudes. What do you hear?
  - 6) Describe specifically how changing the amplitude affects the visual depiction of the sound waves in the sim.
  - 7) Move the student back and forth. Explain what you hear.
  - 8) What can you conclude about amplitude and frequency of sound waves?

## **PART B:** INTERFERENCE OF TWO SOURCES

- Go to 'Two Source Interference' tab and click the play arrow
- Observe the interference pattern made by the sound waves coming from two speakers.
- 9) Sketch the pattern using shades of gray.
- 10) 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.
- 11) Adjust the frequency of the two sources
  - a. Describe what happens
  - b. Sketch the pattern

### **PART C:** INTERFERENCE BY REFLECTION

- Go to 'Interference by Reflection' tab and click play
- 12) Sketch the pattern using shades of gray.
  - 13) Describe what is happening with the waves where you see white spots, dark spots, and gray spots.

### **PART D:** VARYING AIR PRESSURE

- Go to 'Listen with Varying Air Pressure' tab and click play
    - Make sure that "Audio Enabled" and "Listener" tabs are checked.
    - *Operating Note: If the sim seems to malfunction, try clicking the "Audio Enabled" tab off and back on.*
- 14) What can you hear when the pressure is at 1 atm? Record your observations.
  - 15) Remove the air from the box. Watch the pressure gauge and listen. Record what happens. *(This will be a gradual process.)*
  - 16) Add air back to the box. Watch the pressure gauge and listen. Record what happens. *(This will be a gradual process.)*
  - 17) What can you conclude about sound in a vacuum?
  - 18) Why do you think this happens?