

## Sound Waves

Name \_\_\_\_\_

Learning Goals: Students will be able to

- Explain how different sounds are modeled, described, and produced.
  - Design ways to determine the speed, frequency, period and wavelength of a sound wave model.
1. Use the **Listen to a Single Source** tab in the PhET simulation *Sound Waves* (phet.colorado.edu) to start your investigation of sound. Turn on the **Audio Enabled** so you can hear the sound.
    - When you change the frequency, how does the sound change?
    - How does the visual model change?
    - How does changing the amplitude affect the sound and its model?
  2. Sound is produced when something vibrates; this movement causes disturbances in the surrounding air pressure. Investigate how the speaker cone moves to produce different sounds. Then, explain the relationships between the movement of the speaker cone and the sound that is made; include drawings to support your explanation.

3. Use the tools on the **Measure** tab to find the speed of sound in air.  $v = d / t$  where  $v$  = speed of sound,  $d$  = distance traveled and  $t$  = time
  - Make a data table that demonstrates you have a good experiment and show sample calculations.

- How do your results compare to information that is published? (Include a citation)

4. How could you find the wave length of a sound?

- Test your idea with several different sounds. Check to see if the results for wavelength make sense. (Include a citation)

5. Describe how you might use the simulation tools to find the period of a wave without using the frequency information. Period is the time it takes for one wave to go by.

- Test your idea with a variety of waves. What waves did you use to test your ideas?
- Check your method by calculating the period using the frequency. Show data and calculations for several trials. Make corrections to the original plan as necessary.

6. 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. What waves did you use to test your ideas?

- Show data and calculations for several trials. Make corrections to the original plan as necessary.

7. The prefix “ultra” means above. What is “above” in ultra-sonic sounds? (provide a citation)

8. Why do you think ultra-sound is useful for looking at small detail within the body?