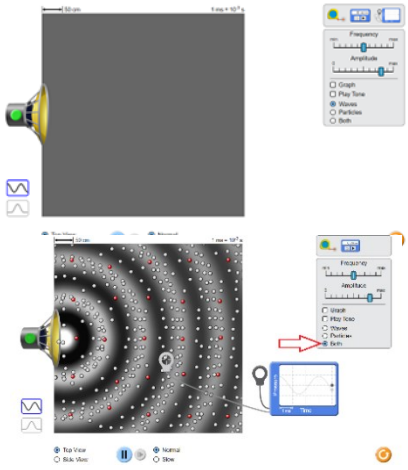
PhET Intro to Waves, Part II: Sound

Name:	Period:
Date:	Assignment #:

Visit http://bit.ly/366gs80 & choose **Sound.**

- As shown in the second screenshot on the right, attach your wavemeter & drag one probe into the wave-viewing area.
- Click on *Both Particles and Waves* so you can watch how both vary.



Procedures

16. Explore the sound simulation as you change the amplitude and frequency. Look for patterns and relationships.
17. Do the particles move in the same direction as the wave or perpendicular to the motion of the wave?

18. What do we call this kind of wave? (Transverse or longitudinal? Check your textbook.)

19. Click Pause button  and make observations: Are the particles closer together or farther apart in the white area of the wave-viewing area?

20. What is the name for this portion of a wave? (Check your textbook.)

21. Are the particles closer together or farther apart in the dark area of the wave-viewing area?

22. What is the name for this portion of a wave? (Check your textbook.)

23. Follow one red dot as the waves pass it. After a number of waves have crossed it what happens to its net displacement? (Hint: Net displacement is the difference between the position of the particle at one peak and the position when the next peak comes through.)

24. Do the particles ever move permanently across the field of view? If the particles are not moving, ***what is*** moving? (Hint: Waves are a type of _____.)

25. The motion of the particles represents the kinetic energy of the air. How would you describe the difference between the total kinetic energy at a peak and the total kinetic energy at a trough? Explain *why* you chose this.

26. **Pause** ⏸ your display and then drag the second probe from your wavemeter into the wave-viewing area. Set the two probes on *different waves*, but at the same compression on those different waves. Let it play again and describe your results. Are the wave motions in phase?

27. While the application runs drag one probe until the two waves are precisely out of phase. Hit pause and describe the parts of the waves that each probe is in.

28. Turn on the sound and change the amplitude. What do we use in everyday language to describe the amplitude of a sound?

29. Change the frequency while watching the waveforms. Does changing the frequency change the amplitude? What kinds of sounds do we associate with higher frequencies? Lower frequencies?

30. Flip back and forth between 'top view' and 'side view.' Based upon these two views, describe the shape of the sound emission.

Honors extension: Set your application to run, then Pause when the screen is full of waves. Add the two probes, setting them so that they are located on waves that are ***exactly out of phase with each other***. You observed that a higher magnitude equals a louder sound, and more energy. How high is the combined amplitude when the peak of one wave is perfectly aligned with the trough of the other wave? How much energy is there when the two waves are precisely overlapping?