

Measuring the Speed of Sound

We have introduced you to the concepts of speed and velocity. To determine something's speed, we must know how far that something goes, and how long it takes that something to get there. In this activity, you will couple what you know about determining something's speed with your ability to measure distances and times . . . using nothing more than your body and its senses – no timers, metersticks, or any other measuring device. What, you say? Impossible? Well, give it your best shot and see what happens.

PROCEDURE:

1. Find a partner.
2. We will be going outside to the track to do this. In no more than 10 minutes, determine the procedure you are going to use to collect the time and distance through which sound travels. Have an instructor approve your procedure. Both partners should write the steps of their procedure down on a piece of paper (which will be turned in). While you wait for your teacher to approve your procedure, practice your ability to measure time and/or distance on your own.
3. In no more than 15 minutes, go outside and collect your data. Both partners should record their data on their paper.
4. Once back inside, use the formula for velocity to determine your estimate for the speed of sound. Show all your work, including the five steps, on your paper.
5. Obtain the speed of sound from your instructor. Compare your estimate with this figure. Likely the two numbers are a bit different. Answer these three questions:
 - a. Is it more likely that your measured distance is too high or too low? How do you know? Explain your reasoning.
 - b. Is it more likely your measured time is too long or too short? How do you know? Explain your reasoning.
 - c. Which of your two measurements do you have more confidence in? Explain your reasoning.

Each partner should turn in their paper with responses to all of the items listed above.