

In this activity, you will determine the speed of sound in air.

**Materials:**

- timer
- measuring tape
- wood blocks
- thermometer

**Procedure:**

- Student one takes the wood blocks and stands on a goal line of the football field. Student two takes the timer and stands on the opposite goal line.
- Student one claps the wood blocks together while student two observes when the blocks are clapped together and measures the time it takes to hear the sound.
- Students will conduct multiple trials to get the most accurate measurement.

**Data and Analysis:**

1. Temperature of air: \_\_\_\_\_

2. Calculate the actual speed of sound in air:

$$v_{\text{sound}} = 331 \frac{\text{m}}{\text{s}} + (0.6 \frac{\text{m}}{\text{s}\cdot\text{C}})(\text{temperature})$$

3. Distance between students: \_\_\_\_\_

4. Students are standing on opposite goal lines, which are 100 yards apart. Convert this distance to meters.

\_\_\_\_\_

5. Time (s):

Trial 1: \_\_\_\_\_

Trial 2: \_\_\_\_\_

Trial 3: \_\_\_\_\_

Average Time: \_\_\_\_\_

questions continued on next page

Unit 6B\_Speed of Sound in Air Lab

6. Using the constant speed equation, determine the experimental speed of sound:

7. Find the percent error between the experimental value and the actual value of the speed of sound:

$$\text{percent error} = \frac{\text{actual value} - \text{experimental value}}{\text{actual value}} \times 100\%$$

**Questions to consider:**

1. Why is there a delay between when you see the wood blocks clap together and when the sound reaches your ear?

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2. What are potential sources of error in your measurements?

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3. Will your results be more accurate if the distance between the two students either increases or decreases? Explain why.

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4. How will the time difference change between seeing the blocks and hearing the sound if the air temperature is warmer? Colder?

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