

Name \_\_\_\_\_ Date \_\_\_\_\_

Partners \_\_\_\_\_

### Wave Properties, Sound Intensity: Lab #3

M.L. West

**Objective:** to become familiar with sound as a wave and to learn to use a sound level meter to characterize the level of sound in various locations.

**Equipment:** Sound level meter, double meter stick, meter stick, Internet, small speakers, function generator

**Sketch:**

**Background:** The intensity of sound varies tremendously from place to place. What are some of the variables which might affect the measured level of sound intensity?

**Procedure:**

1. On the sound level meter turn the range dial to “Batt” to check the battery. If the battery is OK, the needle should go into the solid red or white region on the right side of the scale.
2. Slide the Weighting button to “A”.
3. Slide the Response button to “slow”.
4. To measure the sound level in a place, slowly turn the Range dial down from 120 decibels until the needle moves to the right. The measurement of sound level is the range setting plus the needle reading.

For example:      Range            70 db  
                         Meter needle   -2 db  
                         Sound level     68 db

5. Investigate how the sound level is affected by the distance from the source of the sound.

Distance (m)	Sound Level (db)
1	
2	
3	

6. Investigate the sound levels in various locations.

Please turn the range dial to “Off” when you go between buildings or locations. We will return to our classroom to share data 30 minutes before the end of the class period.

Location	Description of place	Sound Level (db)
A physics classroom		
An empty classroom		
Hallway		
Outside a building		
Music Building	outside an active practice room	
Music Building	inside an active practice room	
Cafeteria		

7. The physics group at the University of Colorado has written a cute simulation of sound waves which we will investigate briefly.

Go to **phet.colorado.edu** and click on “Go to the simulations.” Scroll down and click on the picture for “Sound.”

Click on “audio enabled” if your computer has earphones attached.

Slide the frequency slider and describe what happens in the picture and the sound:

Slide the amplitude slider and describe what happens in the picture and the sound.

Click on “Listener” and describe how the sound is different from “Speaker.”

Click on the Measure tab. Measure the speed of the wave and describe your technique.

Speed = \_\_\_\_\_

Choose the tab for Listen with Varying Air Pressure and try removing the air from the box.

Describe what happens.

8. Research the decibel levels expected for normal talking, passenger car, jack hammer, jet.

**Conclusions:**

**Discussion of Errors (uncertainty in the decibel level measured):**

**Future work in this field:**