

Name _____ Date _____

Partners _____

Wave Properties, Sound Intensity: Lab #2

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

Equipment: small speaker, function generator, sound level meter, double meter sticks, Internet access, personal earphones

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” if you have a dark grey sound level meter.
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	
4	
5	

Plot a graph of the sound level vs. distance from the source (x axis).

Conclusion:

6. Investigate the sound levels in various locations. Measure the six places in the table, then check two or three more places of your choice. Be creative!

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)
RI-261	A physics classroom	
	An empty classroom	
	Outside a building	
	Near a car or bus	
	Cafeteria	
	Toilet flushing	

Findings from the whole class:

100's dB	
90's	
80's	
70's	
60's	

7. The physics group at the University of Colorado has written a cute simulation of sound waves.

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

Attach your earphones to your computer, then click on “audio enabled.”

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

Slide the amplitude slider and describe what happens in the picture and in 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 = _____

Your technique:

Choose the tab for Listen with Varying Air Pressure. Try removing the air from the box. Describe what happens.

8. Research the decibel levels expected for normal talking _____ dB

passenger car _____ dB

jack hammer _____ dB

jet aircraft _____ dB

Conclusions:

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

Future work in this field: