

Sound

6pts TITLE: GENERAL DECIBLES

Sound Environment	Sound Pressure Level (dBA SPL)	Approximate loudness with regard to ordinary conversation
Threshold of hearing	0	
Broadcast studio interior or rustling leaves	10	
Quiet house interior or rural nighttime	20	
Quiet office interior or watch ticking	30	
Quiet rural area or small theater	40	
Quiet suburban area or dishwasher in next room	50	
Office interior or ordinary conversation	60	Ordinary Conversation
Vacuum cleaner at 10 ft.	70	
Passing car at 10 ft. or garbage disposal at 3 ft	80	
Passing bus or truck at 10 ft. or food blender at 3 ft.	90	
Passing subway train at 10 ft. or gas lawn mower at 3 ft.	100	
Night club with band playing	110	
Threshold of pain	120	

5 pts TITLE: OSHA TABLE

OSHA Daily Permissible Noise Level Exposure*	
Hours per day	Sound level
	90dB
	92dB
	95dB
	97dB
	100dB
	102dB
	105dB
	110dB
	115dB

*Before hearing damage occurs....

14pts BIG DECIBEL TABLE

Table of sound levels L (loudness) and corresponding sound pressure and sound intensity			
Sound perception Examples with distance	Decibel Increase Or decrease	SPL Newtons / meters ² = Pa	Sound Intensity / Watts / meters ² energy power
Jet aircraft, 50 m away --256x louder--			
Threshold of pain --128X louder--			
Threshold of discomfort --64x louder--			
Chainsaw, 1 m distance --32x louder--			
Disco, 1 m from speaker --16x louder--			
Diesel truck, 10 m away --8x louder--			
curbside of busy road, 5 m --4x louder--			
Vacuum cleaner, distance 1 m --2x louder--			
Conversational speech, 1 m --baseline--	0	1	1
Average home --1/2 as loud--			
Quiet library --1/4 as loud--			
Quiet bedroom at night --1/8 as loud--			
Background in TV studio --1/16 as loud--			
Rustling leaves in the distance --1/32 as loud--			
Threshold of hearing --1/64 as loud--			

12pts TITLE: DISTANCE TABLES AND QUESTION

The **sound pressure level** (SPL) decreases with doubling of distance by (-)6 dB. The sound pressure drops with the ratio $1/r$ of the distance.

The **sound intensity level** decreases by 25% for every doubling of distance.

Sound source Distance from reading	dB SPL	volume	Factor Loudness
1m	120		
2m			
4m			
8m			
16m			
32m			
64m			

Problems:

Fill in the chart:

Sound source Distance from reading	dB SPL	volume	Factor Loudness
1m	80		
2m			
4m			
8m			

Fill in the chart:

Sound source Distance from reading	dB SPL	volume	Factor Loudness
1m	110		
2m			
4m			
8m			

2pts)

How far would you have to be from a sound source for it to be $1/16^{\text{th}}$ as loud as being 1m from it?

10pts- TITLE: Sound problems

1. You are playing your stereo at 67dB home, and your parents tell you to turn it down by 50%, what would the volume (dB) be?
2. How more much power does it take double the loudness (human reading) of a speaker from 60-70dB.
3. How many more SPLs does it take double the loudness (human reading) of a speaker from 60-70dB.
4. You are playing your stereo at 88dB home, and your parents tell you to turn it down by 50%, what would the volume (dB) be?
5. How more much power does it take quadruple the loudness (human reading) of a speaker from 60-80dB.
6. How many more SPLs does it take to increase the loudness by a factor of 8 (human reading) of a speaker from 60-100dB.
7. You are playing your stereo at 70dB home, and your parents tell you to turn it up to 100dB, How many dB increase is this?
8. How more much power does it take to do this?
9. How many more SPLs are produced?
10. How much louder will it seem to you?