



## 24.3 Decibel Scale

**READ**


The loudness of sound is measured in decibels (dB). Most sounds fall between zero and 100 on the decibel scale making it a very convenient scale to understand and use. Each increase of 20 decibels (dB) for a sound will be about twice as loud to your ears. Use the following table to help you answer the questions.

10-15 dB	A quiet whisper 3 feet away
30-40 dB	Background noise in a house
65 dB	Ordinary conversation 3 feet away
70 dB	City traffic
90 dB	A jackhammer cutting up the street 10 feet away
100 dB	Listening to headphones at maximum volume
110 dB	Front row at a rock concert
120 dB	The threshold of physical pain from loudness

**EXAMPLE**


- How many decibels would a sound have if its loudness was twice that of city traffic?

**Solution:**

**City traffic = 70 dB**  
**Adding 20 dB doubles the loudness.**  
 **$70 \text{ dB} + 20 \text{ dB} = 90 \text{ dB}$**   
**90 dB is twice as loud as city traffic.**

**PRACTICE**


- How many times louder than a jackhammer does the front row at a rock concert sound?
- How many decibels would you hear in a room that sounds twice as loud as an average (35 dB) house?
- You have your headphones turned all the way up (100 dB).
  - If you want them to sound half as loud, to what decibel level must the music be set?
  - If you want them to sound 1/4 as loud, to what decibel level must the music be set?
- How many times louder than city traffic does the front row at a rock concert sound?
- When you whisper, you produce a 10-dB sound.
  - When you speak quietly, your voice sounds twice as loud as a whisper. How many decibels is this?
  - When you speak normally, your voice sounds 4 times as loud as a whisper. How many decibels is this?
  - When you yell, your voice sounds 8 times as loud as a whisper. How many decibels is this?