

Name: _____ Period: _____ Date: _____

Environmental Science

#7-6: Noise Pollution Lab

Introduction

Sound is made up of vibrations that travel through the air (or another medium) that can be heard when they reach the ear. Sound may be classified as noise based on its magnitude, characteristics, duration and time of occurrence. The scale for measurement of sound pressure is called decibels (dBs). Decibels are measured on a logarithmic scale, which means that a small change in the number of decibels results in a huge change in the amount of noise and the potential damage to a person's hearing.

Exposure to loud noises can cause a temporary threshold shift (TTS) in hearing sensitivity or a permanent threshold shift (PTS). A noise-induced permanent threshold shift (NIPTS) is a permanent threshold shift that can be attributable to noise exposure, meaning permanent hearing loss has occurred. If you experience a permanent threshold shift, it is normally best treated with hearing aids – there is no cure.

In this activity, we will use a smartphone app to record average and peak noise levels in three different locations at school. Then, we will compare their average and peak levels to other “noisy” human activities.

Prediction

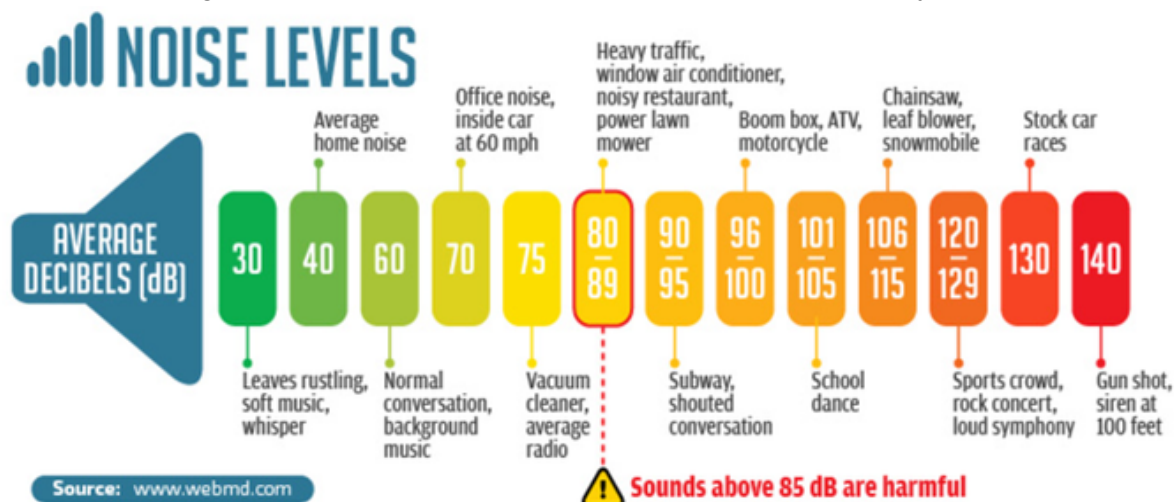
Where do you think the greatest noise levels in the building are located? Why do you think so?

Equipment

smartphone or iPad

Procedure

1. Before starting, download the free app “Decibel X” onto an iPhone, iPad or Android smartphone or tablet. You can also use the free app “Niosh Sound Level Meter” on iPhones.
2. With your partner, decide on three locations in the school where you’d like to record noise levels. Record these in the data table.
3. At each location, you will record noise levels for at least five minutes. Make sure your device’s microphone is pointing at the source of the sound. **Do not speak while recording**, and make sure your device is in “airplane” mode, otherwise you may alter your data.
4. Record the average noise level and peak noise level for each location in your data table.



Data

Location	Average (dB)	Max/Peak (dB)	Comparable Noise Level

Questions

1. Was your prediction correct? What do you think of these results?
2. What would be one strategy that could be used to lower the noise levels in one of the locations you measured? How effective do you think this would be? Explain.
3. Using online resources, what are three ways that noise pollution can negatively impact wildlife?
4. The table below shows the average sound exposure levels needed to reach the maximum allowable daily dose of 100%. Any exposure above 100% dose can permanently damage your hearing. Looking at the diagram above, what is one location, activity or event where you've possibly experienced greater than your maximum allowable daily dose? What do you think could happen to your hearing in the long term as a result?

Time to reach 100% noise dose	Exposure level per NIOSH REL
8 hours	85 dB(A)
4 hours	88 dB(A)
2 hours	91 dB(A)
60 minutes	94 dB(A)
30 minutes	97 dB(A)
15 minutes	100 dB(A)
7.5 minutes	103 dB(A)
3.75 minutes	106 dB(A)
1.86 minutes	109 dB(A)
56 seconds	112 dB(A)
28 seconds	115 dB(A)
14 seconds	118 dB(A)
7 seconds	121 dB(A)

