Population exposure to noise

Introduction

We get about 11% of the information from the outside world through our hearing. Therefore, it is important that we save our hearing and avoid harmful noise. We consider noise to be any undesirable, unpleasant, disturbing or harmful sound to a person. This can be dangerous in the long run from as low as about 70 dB. The increasing traffic intensity on the road, coupled with the increasing urbanisation of cities in recent decades, has also changed the perception and attitude of man to noise, which is increasingly affecting the quality of life and health of the exposed population.

Learn about the problem

Use the internet, (scientific / popular) literature, or in collaboration with experts to find available noise information and its permitted standards for each type of space. Also focus on the following questions:

• What sources of noise exist?
• Which sources of noise are predominate near your home / school?
• Are there any sounds during your sleep?
• What impact does noise have on human health?

Recommended resources

Source 1:	Source 2:	Source 3:
How much noise is too much noise?	What is noise pollution?	Transport and ecosystems

Verify the occurrence of a problem in your area with your own research

Goal

Using the noise measurement application, students can measure noise intensity. Students are aware of the impact of noise on their health and know how to protect themselves from it.

Tools & Materials

• mobile phone (with internet connection)
• noise measurement application:
  Decibel X: dB, dBA Noise Meter (iOS)
  Decibel X - Noise Detector (Android)
• camera
• map
• a table showing the effects of noise on humans
• recording card

Implementation

At the beginning, choose the territory (e.g. school premises) and the specific places where you will measure the noise intensity (e.g. in front of the school entrance, in the relaxation zone, etc.). These locations may be both indoor and outdoor. Mark the selected locations on the map. Attach a recording card to the map where you will write the measured values. Repeat the measurements at all selected locations in the morning and at the same time in the afternoon (e.g. 8:00 and 13:00). Use the mobile app to measure noise intensity

and during measurement don't make any sounds that may affect the results. You can add different sounds from your school environment to your measurements (e.g. school bell, school radio, etc.)

Measurement

Measure the intensity of the noise using the mobile application at selected locations and at the selected time. Enter the data you have recorded in the prepared recording card. Try to identify the source of noise (e.g. traffic, mower, noisy conversation) and record it. Compare the measured data with the permissible noise values. Based on Tables 1 and 2, evaluate how recorded noise affects human health.

Table no. 1: Outdoor human health impact:

Value	Recording card	Effect
0 – 30 dB	1	Satisfactory
31 – 50 dB	2	Satisfactory with some disturbances
51 – 65 dB	3	Negative impact on long-term exposure
66 – 90 dB	4	Unsatisfactory
91 or more dB	5	Damaging

Table no. 2: Indoor human health impact:

Value	Recording card	Effect
0 – 30 dB	1	Satisfactory
31 – 40 dB	2	Satisfactory with some disturbances
41 – 65 dB	3	Negative impact on long-term exposure
66 – 90 dB	4	Unsatisfactory
91 or more dB	5	Damaging

Analysis of results and proposal of solution

What values did you manage to measure? Have the noise levels exceeded the permitted limits in some locations? Which places were the noisiest and the quietest? What was it caused by? How could noise in problematic places be reduced or eliminated? Record your solution suggestions and select the ones you can implement.

Implementation of the solution and evaluation

Did you manage to implement some solutions? If so, did you get better results with repeated measurements? How do you rate selected solutions? How did the environment react to your efforts? Are there other solutions that you could apply? If so, implement them and repeat the measurement.

How did you feel after implementing the selected solution?

Frustrated	Disappointed	Rather Negative	Neutral	Rather Positive	Satisfied	Enthusiastic
◯	◯	◯	◯	◯	◯	◯

Publicity

Record and share photos on social networks with #mybioprofile during the activity.
Help others to join us.

Table no. 3: Sources of noise and their intensity

Sound Source	Sound intensity (dB)
fizzing grass, nightlife in the countryside	10
whisper, ticking the clock	20
urban noise at night	40
human speech, TV in the home	60
croaking frogs	65
busy street	70
shouting, vacuum cleaner, noise in the railway tunnel	80
cock crowing	85
motor vehicle	90
disco, crying baby	110
rock concert	120
gun shot	150
firecrackers, start of a jet aircraft	170

Example

Recording Card					
Name	John Doe				
Class	9				
School	Elisabeth's Elementary school				
City	London				
Date and time	**Location**	**Outdoor / Indoor**	**Noise source**	**Measured noise value in dB**	**Effect on human health**
05.05.2019 08:00	dressing room	indoor	human speech	63	3
05.05.2019 08:00	entrance to school	outdoor	transportation	72	4
05.05.2019 08:00	school yard	outdoor	distant street	28	1
05.05.2019 08:00	dining room	indoor	human speech	46	3
05.05.2019 13:00	dressing room	indoor	human speech	62	3
05.05.2019 13:00	entrance to school	outdoor	transportation	49	2
05.05.2019 13:00	school yard	outdoor	distant street	68	4
05.05.2019 13:00	dining room	indoor	human speech	72	4

Recording card - Population exposure to noise

Recording Card					
Class					
School					
City					
Class					
Date and time	**Location**	**Outdoor / Indoor**	**Noise source**	**Measured noise value in dB**	**Effect on human health**