

# Educational manual for healthy habits and sound environments

## Manual educativo para criação de hábitos e ambientes sonoros saudáveis

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### ABSTRACT

**Introduction:** Noise is one of the main environmental problems observed in big cities. Studies on sound contamination in the school environment have shown that the main sources of noise pollution are the very members of the school community, although they generally fail to recognize their contribution to the problem. Hence, in order to create a healthy hearing environment in schools educational actions are vital. **Purpose:** To present an educational manual for creating healthy hearing habits and environments in the school setting. **Methods:** Databases, online libraries, sites, books, manuals and periodicals were consulted to devise the manual based on health education theories. **Results:** The manual describing the six steps of the program for creating healthy hearing habits and environments was presented. **Conclusion:** Implementation of this educational manual can contribute to school community empowerment regarding noise issues and favor the creation of healthy hearing habits and environments.

**Keywords:** Child; Health education; Hearing loss; Sound contamination; Health promotion; School health

### RESUMO

**Introdução:** O ruído é um dos principais problemas ambientais observados nos grandes centros urbanos. No caso do excesso de ruído presente na escola, pesquisas apontam que as principais fontes de ruído são os próprios membros da comunidade escolar, os quais, em geral, não percebem sua própria responsabilidade na geração do problema. Portanto, a fim de produzir um ambiente sonoro escolar saudável, é vital que sejam desenvolvidas ações educativas. **Objetivo:** Apresentar um manual educativo para criação de hábitos e ambientes sonoros saudáveis, no contexto escolar. **Métodos:** Foram consultadas bases de dados, bibliotecas virtuais, páginas eletrônicas, portais, livros, manuais e periódicos para a elaboração do manual, baseado nas teorias de educação em saúde. **Resultados:** Apresentação do manual, descrevendo as seis etapas do programa educacional para a criação de hábitos e ambientes sonoros saudáveis. **Conclusão:** A implantação desse manual educativo poderia contribuir com o empoderamento da comunidade escolar nas questões relacionadas ao ruído e favorecer a criação de hábitos e ambientes sonoros saudáveis.

**Palavras-chave:** Criança; Educação em saúde; Perda auditiva; Poluição sonora; Promoção da saúde; Saúde escolar

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## INTRODUCTION

Beyond a mere problem of acoustic discomfort, sound pollution is a potentially dangerous to general health and represents one of the main environmental problems caused by the unbridled growth of cities.

The problem of excessive noise in the work place has been studied for decades, resulting in the development of hearing conservation programs, underpinned by a vast legal framework and pedagogic support that facilitate the devising and implementation of hearing conservation projects<sup>(1)</sup>. By contrast, studies investigating sound pollution in the school setting, its impact on the teaching-learning process and the general health of individuals exposed to it, as well as possible strategies for promoting healthy hearing, are more recent and scarce<sup>(2,3)</sup>.

A number of these studies, focusing on healthy hearing of children and adolescents, have sought to promote behavioral changes regarding exposure to high noise levels, particularly during leisure time activities<sup>(4,5,6)</sup>.

With regard to high noise levels in education facilities, studies have shown that noisy behaviour by the very members of the school community is often cited as the source of sound pollution<sup>(7)</sup>. This finding points to the need to run actions that help raise awareness on the importance of involvement in promoting self-health and improving the local environment<sup>(8,9,10)</sup>.

A program based on health education theories empowers schools, in all their complexity, through reflection and awareness, to become involved in creating a healthy hearing environment<sup>(4,5,6)</sup>.

To this end, a manual which aids the devising, application and efficacy assessment of an educational program that encourages the adoption of healthy hearing habits and environment can serve not only to as pedagogic support for actions promoting healthy hearing, but also help to standardize guidance and actions, favoring scientific rigor and quality of the program<sup>(3,4,5,6,10,11,12,13,14,15)</sup>.

In Brazil, however, there are few published materials addressing this issue in the field of Audiology and Speech-language pathology. Therefore, the objective of the present study was to present an educational manual for creating healthy hearing habits and environments in the school setting<sup>(3)</sup>.

## METHODS

An exploratory study based on health education theories was carried out.

Databases, online libraries, electronic pages, sites, books, manuals and periodicals were consulted to gather information for a manual<sup>(10,11,12,13,14,15)</sup> outlining stages and activities for implementing an educational program on noise and healthy hearing.

The key search terms employed were: healthy hearing - alone - and in combination with health promotion, child, school, and health education.

## RESULTS (PRESENTATION OF MANUAL)

The manual was structured as follows:

### 1. Presentation of program to school team

The proposal shall first be presented to the school team at a meeting addressing the main issue underlying the program – noise in the school environment.

While clarifying doubts about the application of the program, all should be motivated to act as agents of change during its implementation in the school.

### 2. Measurement of sound pressure levels

Readings should be taken within different ambiances of the school facility, before and immediately after application of the program, at the same points within the spaces chosen for assessment, every 30 seconds for 3 minutes.

### 3. Application of self-perceived noise questionnaires

Self-perceived noise questionnaires shall be applied to the students (Appendix 1) and teachers (Appendix 2). The individual applying the tests should clarify any doubts arising during completion of the questionnaires.

### 4. Meetings

The meetings shall be dedicated to the reflection and awareness needed to help create a healthier environment and to promote communication and learning.

For application of the program, 5 meetings are to be held over 5 days, each lasting approximately 50 minutes, all centered on playful activities (Appendix 3) to increase the involvement of the children, as outlined below.

#### *First meeting*

On the first day of application of the program, 3 activities shall be run (“*voice ball*”, *soundscape and conversation circle*) to establish a pact for group work, identify the central issue to be addressed, and conduct debate among participants on the core topic, respectively.

#### *Second meeting*

For the second day of the program, 6 activities shall be run (*reading of story “Hector football ace”* (Appendix 4), *conversation circle, free art activity*, “*guardians of silence*”, “*turn down the volume*” (Appendix 5) and “*noise thermometer*” (Appendix 6), to draw attention to the central topics to be addressed during the program (sound pollution, negative effects of noise on health, and learning actions for protecting and promoting health) and favor reflection and

learning, in addition to strengthening and validating the agreements reached in the first meeting.

### **Third meeting**

In this meeting, the activities (*video “Virtual Man”, conversation circle, song “Hush”* (Appendix 7), and *campaign against noise at school*) shall be run, presenting information about the structure and function of the peripheral auditory system and allowing time for doubts and/or queries about the structure and physiology of hearing, besides providing some strategies to tackle excessive noise in the school setting.

### **Fourth meeting**

For the penultimate day of the program, 2 tasks shall be scheduled (*presentation of items produced and collaborative works*), aimed at revisiting and consolidating the previously addressed content.

### **Fifth meeting**

The task **presentation of items produced** in the older groups of children, and the **group discussion** task for groups not presenting work, shall be the last 2 activities of the meetings planned, with the aim of summarizing the main topics addressed, the strategies proposed for reducing noise in the school setting, and other health promotion actions.

## **5. Assessing effectiveness of the program**

This phase takes place immediately after conclusion of the activities proposed for the last day of the program. The self-perceived noise questionnaires shall be reapplied and sound pressure readings taken again.

## **6. Closure**

On the week after applying the program, a closing activity with the participants shall be run. The concepts studied in the program and strategies for combating sound pollution in the school environment and promoting healthy hearing will be reviewed. Comparison of answers on the questionnaires can be highlighted with the noise level readings pre and post-program, outlining the improvements and indicating the problems still to be tackled. Prizes may be awarded for the projects.

A month of the year can also be elected in which to annually remind about the actions of the program by running an action involving the whole school (e.g. workshops, art exhibitions, theater, drama reading, recounting experiences), thereby promoting attention to the hearing environment of the school.

## **DISCUSSION**

Studies have shown that, from an early age, children can be exposed to high levels of sound pressure in the different ambiances they frequent, including those dedicated to learning<sup>(7,9)</sup>.

Running a program for healthy hearing in schools, encouraging the participation of members of the school community, can lead to the creation of healthier environments and improvements in the quality of life of those involved<sup>(3,4,5,6,10,14,15)</sup>.

Manuals are widely used as an supporting aid for health education programs<sup>(3,11,12,13)</sup>. Thus, this project sought to present an educational manual containing the elements needed for implementing a program aimed at encouraging students, teachers, support and management teams, along with other members of the school, to reflect on noise within the school setting and to create healthier habits and hearing environments.

In order to produce this manual, the content, language and activities used were adapted for the target audience (school community) facilitating learning, fostering reflection and raising awareness on actions to promote healthy hearing and create a healthy hearing environment. Therefore, educational practices centering on problem solving and based on a group discussion process (conversation circles, collaborative works, presentation of items produced) and self-assessment (questionnaire, “voice ball” pact, “guardians of silence”) were used, aimed at seeking alternatives for change and attaining effective and long-term results, adopting theories from studies on health education<sup>(5,6,11,12,13,14)</sup>.

The literature emphasizes the importance of running health promotion actions that provide the population with the means to empower them to improve their health<sup>(8,11,13)</sup>. Therefore, the activities proposed for the meeting place emphasis on the participation of all members of the program, involving them in the issue and in seeking group solutions for the problem at hand and running actions promoting healthy hearing.

The manual needs to be applied and its validity tested. It manual can be easily applied by teachers or management teams of schools, favoring the multiplication, expansion and maintenance of the program.

## **CONCLUSION**

Implementation of this educational manual can contribute to school community empowerment regarding noise issues and favor the creation of healthy hearing habits and environment besides the active participation of those involved in promoting self-health and improvements in their local environment.

## **REFERENCES**

1. Samelli AG, Fiorini AC. Saúde coletiva e saúde do trabalhador: prevenção de perdas auditivas. In: Bevilacqua MC. Tratado de audiologia. São Paulo: Santos; 2011. p. 455-72.
2. Warner-Czyz AD, Cain S. Age and gender differences in children and adolescents’ attitudes toward noise. *Int J Audiol.* 2016;55(2):83-92. <https://doi.org/10.3109/14992027.2015.1098784>

3. Costa AS, Durante AS. Proposta de elaboração de manual de promoção da saúde auditiva no contexto escolar. *Arq Med.* 2015;60(supl. 2):28-9.
4. Knobel KA, Lima MC. Effectiveness of the Brazilian version of the dangerous decibels (®) education program. *International Journal of audiology.* 2014;53 Suppl 2:S35-42. <https://doi.org/10.3109/14992027.2013.857794>
5. Lacerda ABM, Soares VMN, Gonçalves CGO, Lopes FC, Testoni R. Oficinas educativas como estratégia de promoção da saúde auditiva do adolescente: estudo exploratório. *Audiol Commun Res.* 2013;18(2):85-92. <https://doi.org/10.1590/S2317-64312013000200006>
6. França AG, Lacerda ABM. Promoção da saúde auditiva: estratégias educativas desenvolvidas por estudantes do ensino médio. *Disturb Comun.* 2014;26(1):365-72.
7. Eysel-Gosepath K, Daut T, Pinger A, Lehmacher W, Erren T. Sound level and their effects on children in a German primary school. *Eur Arch Otorhinolaryngol.* 2012;(12):2475-83. <https://doi.org/10.1007/s00405-011-1899-x>
8. Pelicioni MCF. Educação em saúde e educação ambiental: estratégias de construção da escola promotora da saúde [tese de livre-docência]. São Paulo: Faculdade de Saúde Pública, Universidade de São Paulo; 2000.
9. Chatzakis NS, Karatzanis AD, Helidoni ME, Velegrakis SG, Christodoulou P, Velegrakis GA. Excessive noise levels are noted in kindergaten classrooms in the island of Crete. *Eur Arch Otorhinolaryngol.* 2014;271(3):483-7. <https://doi.org/10.1007/s00405-013-2442-z>
10. Dangerous Decibels. The Dangerous Decibels classroom presentation. Greeley: University of Northern Colorado; 2013 [citado 24 mar 2013]. Disponível em: <http://www.dangerousdecibels.org>
11. Silva CS, Bodstein RCA. Referencial teórico sobre práticas intersetoriais em promoção da saúde na escola. *Cienc Saúde Coletiva.* 2016;21(6):1777-88. <https://doi.org/10.1590/1413-81232015216.08522016>
12. Hoffmann T, Worrall L. Designing effective written health education materials: Considerations for health professionals. *Disabil Rehabil.* 2004;26(19):1166-73. <https://doi.org/10.1080/09638280410001724816>
13. Alvin NAT, Ferreira MA. Perspectiva problematizadora da educação popular em saúde e a enfermagem. *Texto Contexto Enferm.* 2007;16(2):315-9. <https://doi.org/10.1590/S0104-07072007000200015>
14. Sobel J, Meikle M. Applying health behavior theory to hearing-conservation interventions. *Semin Hear.* 2008;29(1):81-9. <https://doi.org/10.1055/s-2007-1021775>
15. Martin WH, Griest SE, Sobel JL, Howarth LC. Randomized trial of four noise-induced hearing loss and tinnitus prevention interventions for children. *Int J Audiol.* 2013;52 Suppl 1:S41-9. <https://doi.org/10.3109/14992027.2012.74304>

## Appendix 1. Students questionnaire

### Student details

Name: \_\_\_\_\_

Age: \_\_\_\_\_

Gender: \_\_\_\_\_

School Year/Grade: \_\_\_\_\_

Study period: \_\_\_\_\_

### Questions

1. Do you think there is a lot of noise in your school?  
 Yes       No       Sometimes
2. What is the noise level like in your classroom?  
 Low       Regular       High
3. Do you think the noise in the classroom interferes with your school activities?  
 Yes       No       Sometimes

4. During classes, do you find it hard to concentrate or follow what the teacher is saying because of the noise?

Yes       No       Sometimes

5. Do you think the excessive noise can be harmful to your health?

Yes       No       Maybe

6. What noise bothers you the most at school?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. \_\_\_\_\_

What would you do to try and reduce the noise in your school or classroom?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix 2. Teacher questionnaire**

Teacher details

Name: \_\_\_\_\_  
 Age: \_\_\_\_\_  
 Gender: \_\_\_\_\_  
 Year/Grade taught: \_\_\_\_\_  
 Teaching period: \_\_\_\_\_

Questions

1. Do you think there is excessive noise in this school facility?  
 Yes       No       Sometimes
2. How do you rate the intensity of the noise in your classroom?  
 Low       Moderate       High
3. Do you think the noise in the classroom affects school activities?  
 Yes       No       Sometimes
4. Within the classroom, which noise is most bothersome?  
 Chairs/desks being dragged  
 Fans  
 Simultaneous conversations  
 Others  
 Which? \_\_\_\_\_

5. Do you think the excessive noise can be harmful to your health?  
 Yes       No       Maybe
6. Mark the possible health problems you believe can be caused by the noise:  
 Headache    Irritability    Hearing loss    Aggressiveness  
 Digestive problems    Stress    Sleep disturbances
7. Have you ever taken part in a program or campaign to reduce noise in the school setting?  
 Yes       No
8. Do you know of any Program for Promoting Healthy Hearing in schools?  
 Yes, which? \_\_\_\_\_  
 No
9. Have you received guidance on healthy hearing?  
 Yes       No
10. What would you do in an effort to reduce the noise in your school or classroom?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Appendix 3. Description of stages of program implementation**

**1. Presentation of program to school team**

The proposal shall first be presented to the management and heads of the school and subsequently to all teachers and staff at a team meeting. The aim is to address the issue underlying the program – noise in the school environment.

While clarifying doubts about the application of the program, all should be motivated to act as agents of change during its implementation in the school. If possible, the whole school should be involved.

At the meeting, the timeline for executing the program can also be devised and the individuals responsible for carrying out the activities can be nominated (teacher, head, speech-hearing therapist).

This stage shall last approximately one hour.

**2. Measurement of sound pressure levels**

This procedure shall be performed before applying the program and repeated immediately after it, and will require a sound pressure level (SPL) meter (type/class 2).

Readings should be taken within different ambiances of the school facility: e.g. corridors, classrooms, canteen, sports court, library and playground.

When taking the SPL measurements, the operator must position themselves at fixed points in the school classrooms, corridors, canteen,

sports court, library and playground, and then capture and record the readings in decibels every 30 seconds for 3 minutes at each of the designated measurement sites.

The results should be presented during the program closure and discussed with the students.

During the meetings, SPL measurements can be made in *situ* to show program participants the impact of the application, or otherwise, of the educational actions and solutions proposed for reducing noise in the school.

**3. Application of self-perceived noise questionnaires**

The application of self-perceived noise questionnaires for students (Appendix 1) shall take 10-15 minutes on average, depending on age.

After delivering a copy to each child, the speech therapist/teacher must read the questionnaire with them and explain unfamiliar terms to help them understand the questions posed.

The questionnaire applied to students contains 5 closed questions, each with 3 alternatives, plus two open questions.

While the students are answering the questionnaire, teachers may also be asked – in cases where the therapist is overseeing the program – to fill out the teacher questionnaire (Appendix 2) containing 9 closed questions and 1 open question.

#### 4. Meetings

The meetings shall be times set aside for the necessary reflection and awareness needed to help create a healthier environment and promote communication and learning.

For application of the program, 5 meetings are to be held, each lasting approximately 50 minutes, all centering on playful activities to increase the involvement of the children, as outlined below.

##### **First meeting**

On the first day of application of the program, 3 activities will be run:

- **“Voice ball” pact:** activity lasting 5 minutes tackling one of the causes of excessive noise in the classroom: simultaneous conversations.

According to the pact, only the person holding the ball may speak and anyone wishing to ask a question, make a comment or provide other input, has to hold up their hand and wait in silence until they are given the ball.

Possible questions to guide discussion on the topic might be: Is it a problem if everyone speaks at the same time? What can be done to resolve this problem?

The solutions put forward should be jotted down on boards, murals, flip-charts or posters and then communicated to the whole school community.

**Soundscape:** this exercise takes 10 minutes.

While sitting at their places in class, students must close their eyes, remain quiet and listen to the ambient sounds, inside and outside the classroom.

After listening to the ambient sounds (1 to 3 minutes), students are asked to reflect on the guiding questions: Which sounds did you most like hearing? Which sounds were unpleasant? What was the strongest sound and what was the weakest? Do you know what sound pollution is? Do you think there is sound pollution in your school? Does sound pollution interfere with your classroom activities or make it harder to follow what the teacher is saying? These questions should also be used in the following activity:

- **Conversation circle:** lasting 10 minutes, the conversation circle, akin to the previous activity, also aims to sensitize students on the issue of sound contamination both inside and outside the school environment, and help them think of strategies for tackling the problem.

The children and teacher will be asked to report the sounds heard and then the guiding questions outlined in the previously activity will be used to promote discussion and seek solutions for the problem of noise in the school.

The moderator should note down the expressions and strategies suggested for tackling the problem of sound pollution, and then share them with all members of the school.

##### **Second meeting**

For the second day of the program, 5 activities are proposed:

- **Reading of story “Hector football ace”** (Appendix 4): the story was devised specifically for the program to draw the participants’ attention to the concept of sound pollution or contamination of the environment, and also to highlight some of the negative effects resulting from exposure to it and possible strategies for controlling the noise.

Students shall be instructed to remain in their places and listen to the story read out by the speech therapist/teacher, which takes 5 minutes.

Prior to the reading, the following questions will be posed for later summary of the salient points of the story and discussion in the

conversation circle: Why did Hector start performing badly during football training? What health problems did he start having? What solution was found for the problem affecting him?

- **Conversation circle:** based on the guiding questions outlined in the previous item, the students will be invited to express their points of view and reflect on the negative implication resulting from exposure to excessive noise, while using the “voice ball” technique agreed.

This exercise takes 10-15 minutes.

- **Free art activity:** lasting around 25 minutes, this exercise centers on the story “*Hector football ace*” and is aimed at consolidating the topic and concepts addressed during the day.

Each child should produce a drawing, song, poem, poster, or other form of art that illustrates one or more of the salient points of the story, considering the topic discussed.

- **“Guardians of silence”:** From within each classroom involved in the project, “guardians of silence” will be chosen, i.e. 4 or 5 students responsible for helping to remind classmates of the importance of doing their part toward cutting down noise by refraining from yelling, dragging desks and/or chairs and being overly noisy.

Each group of “guardians of silence” shall be chosen at the normal start time of the class and will carry out this role until the end of the period of lessons.

The chosen students will be identified with a special name badge and provided with yellow, red and green cards show their classmates the level of noise in the classroom, during playtime, and in Physical Education lessons.

- **“Turn down the volume” and “Noise thermometer”:** also on the second day of the program, each group will be given “turn down the volume” and “noise thermometer” banners bearing the images shown in Appendices 5 and 6, produced by the school of Speech-language pathology and audiology of the School of Medical Sciences of Santa Casa de São Paulo (FCMSCSP).

The sound intensities harmful to healthy hearing shall be discussed. The banners must then be put in busy places in the school where students, teachers, parents, monitors/inspectors, and management and support teams pass by, to ensure as many people as possible are exposed to the information on noise-induced hearing loss and the dangers of using personal stereos at overly high volume.

##### **Third meeting**

On the third day of application of the program, the following 4 activities will be run:

- **Showing of video on hearing:** The video is short, with a play time of under 2 minutes. The video is part of the “Virtual Man” project run by the Telemedicine discipline of the Medical School of the *Universidade de São Paulo* (USP) available at <http://eaulas.usp.br/portal/video.action?itemId=4323>.

The objective of the activity is to familiarize students with the structure and physiology of peripheral hearing.

- **Conversation circle:** Activity lasting 20 minutes.

After showing of the video on hearing, students are invited to ask questions to clarify any doubts or queries about the auditory structure and physiology.

At this juncture, the speech therapist/teacher shall present some advice for taking care of hearing and strategies for promoting healthy hearing both inside and outside the school environment.

- **Song:** the song “Hush”, written by Thelma Chan, will be used as

a further strategy to help participants deal with an extremely common internal source of noise, namely, students' simultaneous, undisciplined speech at a high intensity level.

Initially, the lyrics to the music (Appendix 7) will be projected on the board and read to the children. The students will then read the lyrics aloud and reflect on their content.

Next, the student can listen to the recording again once or twice and then will be asked to sing the song and perform the mime associated with the lyrics, as they follow the lyrics projected on the board.

The song is part of the CD *Pirralhada (group of children)* by Thelma Chan, and is available at [http://www.4shared.com/file/a5jQTDgA/tehelma\\_Chan\\_-\\_2006\\_-\\_Pirralhad.htm](http://www.4shared.com/file/a5jQTDgA/tehelma_Chan_-_2006_-_Pirralhad.htm)

This activity takes 10 minutes.

**- Campaign against noise in the school:** the participating groups will be asked to devise a campaign on strategies to tackle sound pollution created by noisy behavior of the members of the school community including guidance on hearing care and actions promoting healthy hearing.

For this task, students should be organized into groups of 4 or 5 and research the subject at home, with the aid of parents and/or guardians, producing a publicity piece for the campaign to be presented to classmates later and also to the other groups in the school, such as in a mini exhibition. If possible the exhibition can be staged as a bigger event with viewing open to family members and others interested in the topic.

#### **Fourth meeting**

For the penultimate day of application of the program, 2 tasks are scheduled, the first 15 minutes' long and the second lasting just over 30 minutes.

**- Presentation of items produced:** the items produced individually and in groups, such as posters, songs, models, and cartoon strips on the topic of noise in the school setting and health promotion actions will be presented.

Some items of work will be chosen from each group for presentation in a mini exhibition.

**- Collaborative works:** in order to revisit and consolidate the content seen earlier, students and teachers will be asked to convene at the playground, canteen or other open space in the school to take part in collaborative works (paintings, drawings, posters, texts, etc.) on strategies for promoting healthy hearing and noise reduction in the school environment.

#### **Fifth meeting**

The last meeting in the program entails 2 activities:

**- Presentation of items produced:** on the last day, for the groups of older children, the activity will be the presentation of items produced to the other groups.

This activity takes 30-40 minutes.

**- Conversation circle:** for those groups not presenting work, the following topics will be revisited in the form of a debate: sound pollution in the school environment, healthy communication and hearing care.

The conversation circle will last approximately 20 minutes.

#### **Assessing effectiveness of the program**

This assessment shall take place immediately after conclusion of the activities proposed for the last day of the Program Promoting Healthy Hearing in the School Setting (PPSACE) and aims to determine whether there was increased knowledge on the topic and evidence of changes in attitude with regard to noise.

In this stage, the self-perceived noise questionnaires shall be reapplied and sound pressure level readings taken again.

#### **Closure**

On the week after applying the program, the speech therapist/teacher will return to the classes involved in the project to conduct a closing activity with the participants.

At this juncture, the concepts studied in the program and strategies for combating sound pollution in the school environment and promoting healthy hearing will be revisited. Comparison of answers on the questionnaires can be highlighted together with the noise level readings pre and post-program, outlining the improvements and indicating the problems still to be tackled.

Subsequently, all students involved in the program can be given a small memento which can be produced together with the management of the school such as the book marker "Turn down the volume" (Appendix 5) or the "Noise thermometer" (Appendix 6).

In addition, each group participating in the study can hold a vote for some of the work to be awarded an honorary mention diploma and represent the group in the campaign against sound pollution in the school.

As a closing activity, a month of the year can also be elected in which to annually remind about the actions of the PPSACE program by running an action involving the whole school (e.g. workshops, art exhibitions, theater, drama reading, recounting experiences), thereby drawing attention to the hearing environment of the school.

#### Appendix 4. Story “Hector football ace”

##### “Hector Football Ace”

Hector is a happy, intelligent, curious and very active boy. On turning 10 years of age, his dad asked him if he'd like to have football lessons at the football academy near his house.

– You bet I would, dad! - Said Hector when his dad asked.

– Right then, - replied his dad – I'll enroll you tomorrow. And you can already start training the coming Saturday.

– Wow! Can you buy a new pair of football boots?

– Sure Hector.

So, after several weeks at the football academy Hector began to stand out and catch the eye of the coach, not just because he was a 'football ace' but also because he was disciplined and well-liked by everyone.

Months later, the coach announced some news that got everyone excited: “Guys, three months from now we are going to take part in a tournament involving the city's football academies and if we do well we can go on to compete in the State championship”. The boys were thrilled!

Everyone, including Hector, really wanted to take part and show how well they played. So, it was a jubilant moment when the names of the players in the line-up were announced and his name was on the coveted list. It seemed he had been picked to play in the team....

To better prepare the team, the coach asked the children's parents if they could arrive a little earlier on Saturdays and also stay a little later. It was then that the going got tough for Hector.

– Let's go, go! Run faster, faster! - Urged the coach, standing at the other side of the field. “But, what on earth is going on with Hector”? “His performance has really gone downhill! I'm really concerned, because this is the second Saturday in a row this has happened”.

- Hector, over here please! – Hector ran to the sidelines of the pitch and, really tired out, sat down on the ground next to the coach.

– What's up coach? You called me over because I'm not managing to keep up with the others, right?

– That too, but it's not why. I want to know if everything is alright, if you've been eating properly, sleeping enough, as we agreed, so you can have fun and play well during the championship matches.

– Oh, coach, I've been eating properly, I even started eating more fruit and veg but nobody has slept well at home for a while because there have been parties at a place nearby and the sound system is really loud.

– Really?!

– Yes, and we can't sleep because of the noise which sometime seems to be inside the house. I get headaches, wake up tired to come

to the academy and even get miserable. My mum and dad are really fed up with it all.

– That's a pain, Hector, isn't it?! But, have your parents done anything to try and remedy the problem?

– Yes they have coach. Yesterday, they called a place that sent someone out to see if the sound system was too loud. At least that was what I gathered.

– That's right, Hector, when an establishment, a bar, a function room, or even a neighbor makes a lot of noise...

– It's sound pollution, isn't it coach? I heard my parents saying..

– Hector interjected.

– Yes, yes. And, when we are bothered by excessive noise, we can call the secretary for the environment, town hall, or the office of environment.

– And how do they know if the sound system is too loud?

– Well, they have a device that measures the sound levels and, if the place is indeed too noisy, they issue a warning notice to the owner of the place.

– Like a yellow card?

– The coach laughed at the boy's ingenious comparison and said: “like a “yellow” card... And if the problem is not remedied, not only does the owner of the place have to pay a hefty fine, the place can be shut down for good”.

– Oh, coach! I didn't know this was such a serious matter. I think I'll ask my teacher to explain this a bit more.

– Great idea, Hector! Now you've rested a little, I think it's time to train a bit more? – Asked the coach.

– I think so coach.

– So, off you go, rejoin your teammates. I'll have a word with your parents later to see if we can do something while the noise is still going on there.

Three weeks later, Hector returned to form, because the town hall inspectors had ordered the owner of the function room to fit a sound-proofing system, which ended up working well and meant the neighboring residents were no longer disturbed by sound pollution.

At school, the teacher prepared a very interesting class on the matter and asked the students to do a poster, drawing, song or other item for use in the awareness campaign on noise that the school decided to run.

Say, if you were Hector, what would you do to take part in the campaign and help others protect themselves from sound pollution and reduce the noise, at least in your classroom? Let's help Hector?



**Appendix 5.** Explanatory material “Turn down the volume” (book mark)



**Subtitle:** (left): Don't lose the beauty of the sounds of life. Turn down the volume! Take care of your hearing. Healthy hearing is quality of life. (Right): a whisper... rain against the window... treading on dry leaves... birds singing...



**Appendix 6.** Explanatory material “Noise thermometer”



**Subtitle:** (left): Noise thermometer  
 140 dB: Immediate danger to hearing, Firearm; 120 dB: Risk of hearing loss in 7.5 minutes, Rock concert; 105 dB: Risk of hearing loss in 1 hour, Helicopter; 100 dB: Risk of hearing loss in 2 hours, Power saw and MP3 Player at high volume; 95 dB: Risk of hearing loss in 4 hours, Motorcycle; 90 dB: Risk of hearing loss in 8 hours, Lawn mower; 85 dB: Risk to hearing starts here; 60 dB: Normal conversation; 30 dB: Whisper. (Right): Turn down the volume! The high volume of your MP3 player can cause deafness. Take care of your hearing.

**Appendix 7.** Lyrics to the song “Hush”

Song Hush  
 Writer: Thelma Chan  
 CD: Pirralhada (Group of kids)

Hush, someone in the room is about to speak  
 Hush, when others speak  
 I should listen

Hush to pay attention  
 Hush to hear the voice of the heart!