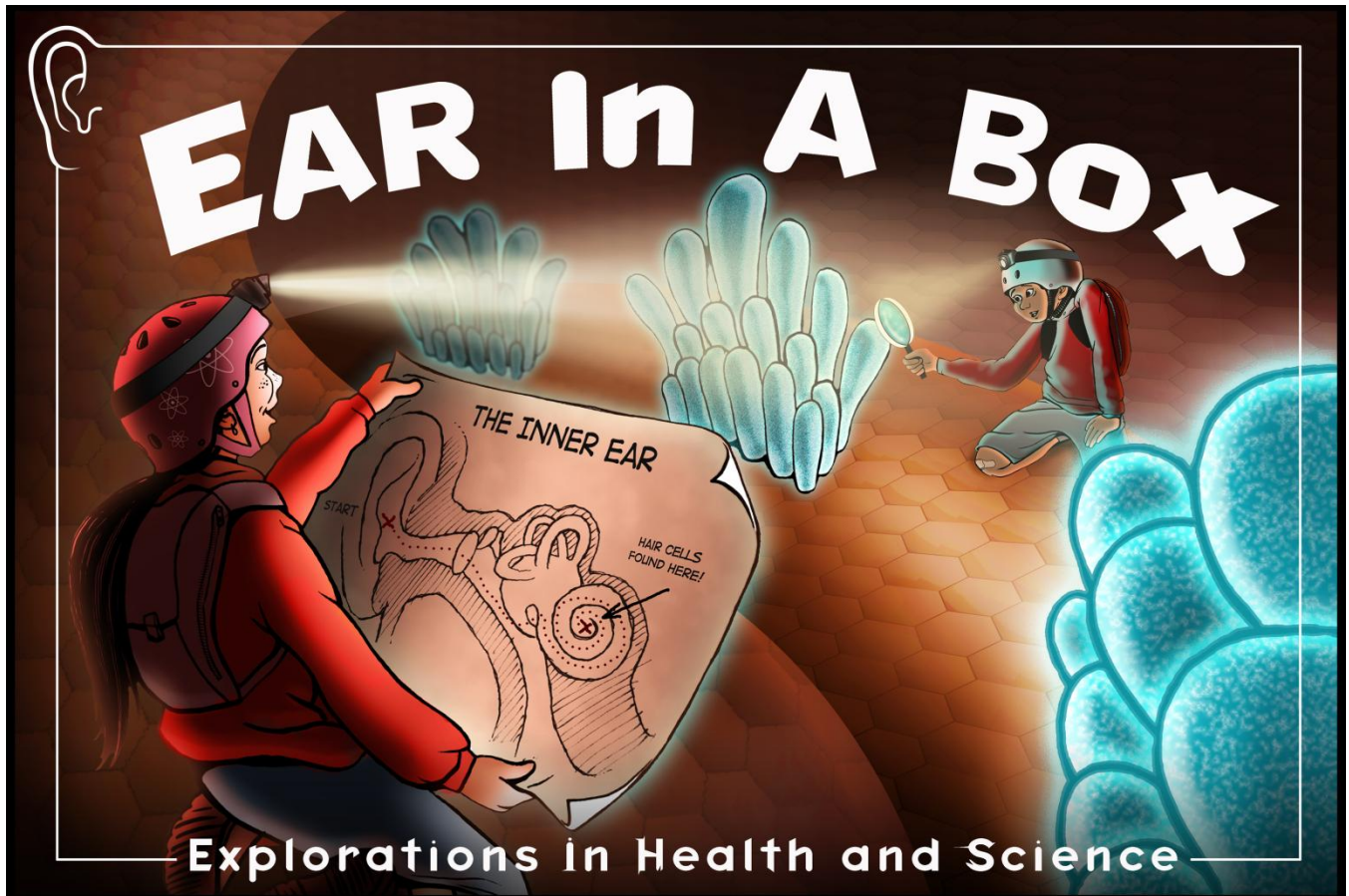


Ambassador Handbook



“School-age children constitute what may be the most important audience you’ll ever address. They are eager to learn more about you and your work as a representative of the scientific community. Moreover, teachers welcome the opportunity to have health professionals come into their classrooms to talk about medicine and the excitement of science and research.”

Communicating Science and Medicine to Children

American Medical Association

Thank you for agreeing to share your career choice with local students!

The goal of **In A Box** curricula is to encourage *Explorations in Science and Health* with rural students of Oregon. Oregon Health and Science University, Area Health Education Centers (AHEC), and the Howard Hughes Medical Institute have teamed up to create this program. You are a vital part of the inspiration.

This guide outlines:

1. Your role as ambassador
2. The station activities
3. The contents of the box

Let’s begin!

I. The format for you (the ambassador) is as follows:

- A. Connect with the teacher whose class you will be visiting to confirm schedules (which can vary with this lesson depending on the teacher’s day).
- B. If you do not arrive at the class with the box, you may want to review its contents by reading over the list below.
- C. Be sure to stop at the school office on your way into the building to get a visitor’s name badge.

When you arrive at the classroom:

II. Introduce yourself and your career. Describe how you came to choose this career and what you really like about it. Talk about who you work with, or depend on, and how science is part of your job. Spend 10 minutes and ask if students have questions.

Emphasize wherever possible that "Science is about asking questions and solving problems"

- A. The teacher will put students into groups so that they can work through five different stations of activities about ear health and the professionals who work with ear and hearing problems.

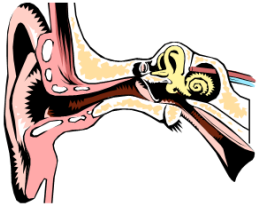


- B. If you can stay and participate, walk around and see what kinds of problem solving the students are doing as they go through the activities.
- C. If you are returning the box to the AHEC coordinator, wait for the student post survey and teacher feedback form so that those can be collected and stored in the box.



This format is very flexible —it can be changed to suit your job and time constraints as well as the teacher’s time frame and unique students.

Enjoy and thank you again!

The following is a preview to the station activities:

Station Content and Objectives:

Stations 1-5	Activity	Resources	Lesson Objective
Ear Anatomy 	Students view each other’s ears for identification labeling	Ear Model, otoscope, and ear template sheet for recording.	To identify visible and hidden parts of the ear using professional technology.
Dangerous Decibels 	Measuring sound levels in decibels	Sound meter Hair dryer Pipe cleaners	To learn about safe levels of sound vs. those levels which cause permanent damage to hearing.
Your are the Professional 	Assume the role of a health professional and make decisions for the patient	Scenario, Role, and Treatment cards	To learn the many roles involved in health science, to make team decisions, and to problem solve.

<p>Hearing Loss</p> 	<p>Listening for pitch and sound variation</p>	<p>Piano</p> <p>Hearing aids</p> <p>Hearing aid pictures</p>	<p>The difference between pitch and sound and our unique hearing abilities and inabilities.</p>
<p>How Sound Works</p> 	<p>Identifying the order of transduction for sound to signal the brain</p>	<p>Ear anatomy chart</p> <p>Individual cards</p>	<p>To learn how sound passes through the ear</p>

Station 1 – Ear Anatomy

In pairs, the students observe each other’s ears using the otoscope and recording what they see on the template of ear anatomy. Rotating students can record what they see while disassembling the ear model and marking that on their template and station notes page.

Teacher Notes:

The otoscope has a light- advise students to handle it carefully and read the directions included. The ear model has two removable parts; please keep these with the model.

Station 2 – Dangerous Decibels

Students first learn to use the sound meter- instructions are attached to it. **Pipe cleaner “hair cells”** - hold a few straight up like a bunch of flowers; tell students these are like our hair cells. Brush your hand across the tops of the pipe cleaners, allowing them to bend, and explain that as loud noises such as fireworks or explosions pass through our ears, the hair cells bend. Students can see how the pipe cleaners never can fully regain an erect position, the same is true of the hair cells in our ears; hearing is damaged when this happens.

Have them look at the thermometer of safe vs. dangerous sound levels. Using the sound meter, have students start by measuring their own talking voices and then check where the

levels are on the thermometer. Then have them turn on the hair dryer and measure the level of sound. If a student has an iPod, that can be measured as well.

Teacher Notes:

Get acquainted with the sound meter and the terms used to measure sound (in the glossary). There are instructions on the sound meter and a demonstration on the Dangerous Decibels Video (Sound Level Meter). Reinforce the idea of permanent hearing loss from dangerous decibel levels with the pipe cleaner analogy.

Station 3- You Are the Professional!

Students read about the hypothetical patient on the card. At the bottom right are roles of professionals who likely would work with this patient. On the back is the team who would likely work together to help this patient. Divide the group by the number of roles and have them read what that professional does with any new patient. On the station notes sheet, have the role groups write their recommendations for this patient once they agree on a plan.

Teacher Notes:

Keep the Treatment plan cards separate until students are done with their recommendations. The treatment plans are what professionals at OHSU said they would do with those patient scenarios. This can be shared after students share their recommendations. For younger students, have the whole group choose one role and then agree on a recommendation plan. One student can be the scribe, one can share with the class, and one can read the professional treatment plan at the end.

Station 4- Hearing Loss

Roll up piano - this specially reconstructed piano shows how hearing certain tones can be lost while other tones remain audible. The questions for students are the following 1) how to differentiate loudness from pitch and 2) how people can lose their ability to hear either.

Teacher notes: Be sure that students understand the difference between pitch and loudness. From NIH, "Loudness is related to the amplitude of the sound wave; pitch is related to its frequency (the number of vibrations per second). Humans do not hear all pitches equally well. The loudness of very low and very high pitched sounds must be increased to detect them. A healthy sense of hearing is characterized by an ability to recognize a wide spectrum of pitches. Hearing loss may involve failure to detect specific pitches. Loudness is described using words such as loud and soft, whereas pitch is described by words such as high and low. The low pitch keys on the left of the piano keyboard and the high pitched keys on the right can be played softly or loudly.

Station 5 – How Sound Reaches the Brain

Students will read about the transduction of energy by sound waves. They will look at the anatomy of the ear as well as descriptions of how each part turns sound into signals; then they will put the individual cards into order of how these messages reach the brain.

Teacher Notes: Hold onto the answer key for the order of the cards until the team is finished with their analysis.

Box Contents

Ear In-A-Box (OHSU) DVD- created with Portland area middle school students interviewing some of the ear professionals at OHSU. This will be shown before you arrive in most cases.

Dangerous Decibels DVD- lesson extensions, instructions for teachers, and more.

Five station envelopes with instructions and tools.

Student surveys- pre and post- these help us to evaluate the effects of In-a-Box curriculum and are to be placed in the box at completion.

Teacher feedback form-

Artifacts

Hearing aid

Sound meter plus- This can be used next to something that makes noise (such as a ringing phone, a blender, etc.) Have students read the sound level and look at the “How Loud is too Loud” wheel for safe and unsafe levels.

Country Doctors video- This one hour long PBS video was made in rural Oregon about the need for local health care providers.

Pipe cleaner “hair cells”- hold a few straight up and run your hands over them, back and forth—this is how our ear hair cells look, and then as loud noises pass over such as fireworks or explosions, the hair cells bend. Students can see how the pipe cleaners never can fully regain an erect position, the same is true of our ear hair cells; hearing is damaged when this happens.

Blueprint for Health Poster of the ear

Roll up piano- this specially reconstructed piano shows how hearing certain tones can be lost while other tones remain audible.

NIH Curriculum – How our brain understands what our ears hear (Grade 7-8) This is a set of extension lessons a teacher may use after this lesson.

Ear model - with a laminated reference chart.

Otoscope with three fitted attachments- Students can look inside each other's ears by twisting the otoscope to turn on the light.

Books: *Hearing, Hearing (Sense and Sensors), and Eyes and Ears*

Hair dryer

Dangerous Decibels wheel and **thermometer**

Ear Box Glossary

Amplification - the act or result of amplifying, enlarging, or extending.

Audiologist - a specialist in audiology - the study of hearing disorders, including evaluation of hearing function and rehabilitation of patients with hearing impairments.

Auditory Nerve - The nerve that carries electrical signals generated by sound from the inner ear to the brain.

Cochlea - a spiral-shaped cavity forming a division of the internal ear in humans and in most other mammals.

Cochlear Implant - an electronic apparatus that allows people with severe hearing loss to recognize some sounds (especially speech sounds), and that consists chiefly of a microphone and receiver, a processor that converts speech into electronic signals, and an array of electrodes that transmit the signals to the auditory nerve in the inner ear.

Congenital - a condition present at birth, whether inherited or caused by the environment, esp. the uterine environment.

Decibel - The unit of measure commonly used to describe the loudness of sounds in our environment. Based on a logarithmic scale in which an increase of 20 decibels (20 dB) indicates an increase in sound loudness by a factor of 10, 40 dB indicates increasing by a factor of 100 and 60 dB indicates increasing by a factor of 1000.

dB - A measure of sound intensity (abbreviation for Decibel).

Frequency - The number of times a sound vibrates per unit of time. Frequency is expressed in hertz (Hz), a unit of measurement equal to one cycle per second.

Hair Cells - Microscopic cells within the inner ear that have tiny, finger-like projections on top. These "hairs" are moved back and forth by the pressure wave in the inner ear fluid. Motion of the hairs leads to the activation of nerves, and it is the electrochemical impulses in these auditory nerves that are transmitted to the brain causing hearing sensations.

Hertz - A unit of frequency (of change in state or cycle in a sound wave, alternating current, or other cyclical waveform) of one cycle per second. It replaces the earlier

term of "cycle per second (cps)." The unit of measure is named after Heinrich

Hertz, German physicist.

Interpreter - a person who provides an oral translation between speakers who speak different languages.

Intervention services- services provided by the school district for children from birth to three years that are at high risk for disabilities or delays.

Mutation - the act or process of changing.

NIH- National Institutes of Health

NIHL- Noise induced hearing loss- irreversible hearing loss caused by exposure to loud impulse sounds or to less intense sounds for an extended period of time. Loud noise levels damage hair cells of the inner ear.

Occupational therapist - Occupational therapists (OTs) help people improve their ability to perform tasks in their daily living and working environments. They work with individuals who have conditions that are mentally, physically, developmentally, or emotionally disabling. O.T.s also help their patients to develop, recover, or maintain daily living and work skills.

Otolaryngologist - an ear, nose & throat doctor.

Pathologist - a doctor who specializes in medical diagnosis; the science or the study of the origin, nature, and course of diseases.

Pediatric - the branch of medicine concerned with the development, care, and diseases of babies and children.

Pitch - The aspect of sound that depends on our ability to perceive different sound frequencies; high-pitched sounds are those with relatively high sound frequencies (e.g. above 1000 cycles per second) while low-pitched sounds are generally those with relatively low sound frequencies (e.g. 200 cycles per second or lower).

Sound Wave - A longitudinal wave of motion, spread through oscillating molecules, initiated by a vibrating surface or by a sudden, rapid force (as in an explosion). In the case of sound waves, the molecules do not actually move to a new location, instead each

set of molecules "bumps" the molecules next to it, progressively transferring

motion to new sets of molecules further and further away from the sound source

until the wave motion dies out.

Speech therapist - a therapist who treats speech defects and disorders.

Tinnitus - a ringing or similar sensation of sound in the ears.

Triage - the process of sorting victims to determine medical priority in order to increase the number of survivors.