



Youth HLP presentation – suggested script

If a yellow bar appears across the top of the PowerPoint screen, you must enable content for all of the slides to work correctly.

*When you see **(click)** in the script, that indicates a mouse click to trigger animations.*

Slide 1 (title)

Introduce yourself and tell them that today you will be talking about sounds, how we hear them, and how we can protect our hearing when sounds are too loud.

Slide 2

Before we can talk about hearing, we need to talk about sound. So what is sound? **(click)**

Sound is energy traveling in waves of pressure through air, water, or solid materials **(click)**

This diagram shows how we represent sound waves.

- The height of the wave tells us how loud it is.
- The length of the waves tell us the pitch (how high or low it sounds) the sound is. *(with cursor or laser pointer, trace one of the waves to show the wavelength is from center line to apex to nadir and back to center.)*
- In this image, the red and blue waves represent the same pitch, but the blue one is louder.
- The green wave is higher pitched, and is just a little louder than the red wave.

Slide 3

How fast do you think sound travels? Pretty fast, right? **(click)**

Sound travels at 760 miles per hour in air. That's 1 mile in just under 5 seconds! **(click)**

Have you ever been outside having a good time and then you see a storm come rolling in? **(click)**

Do you know how to tell how far away the storm is? Thunder and lighting actually happen at the same time, but because light travels much faster than sound, we perceive a pause between them. Count the seconds from when you see the lightning until you hear the thunder. Divide that by 5 and that's how many miles away it is.

Slide 4

How big do you think sound waves are? **(click)**

Sound waves that humans can hear are about 2/3" long, which is slightly smaller than a dime **(click)**

All the way up to 56 feet long! That's 10 bicycles in a row!

Sound waves from human voices are between 1 foot (like a ruler) and 12 feet long (12 feet = 4 yardsticks, 2 yoga mats, 2 refrigerators...choose one example to use for 12 feet)

Slide 5

Now that we know what sound is and how it travels, we can talk about how we hear it. *(click)*

This is what your ear looks like inside your head. *(click)*

When a sound happens, like this trumpet playing, the sound wave travels through the air *(use cursor or laser pointer to trace the path the sound takes as you talk through it)*

- It enters through outer ear – the part you can see - and travels through the ear canal until it hits the eardrum in the middle ear, which starts to vibrate.
- When the eardrum vibrates, it moves the 3 tiny bones in your middle ear that together are called the ossicles. We also call them the hammer, anvil, and stirrup, because of their shapes). Vibrations in these bones help move the sound into the inner ear.
- The vibrations then move into the cochlea, a very small, snail-shaped organ. How small? About 9mm. The cochlea is filled with liquid and thousands of tiny cells that are covered with hairs
- Sound vibrations travel through the liquid and make these hairs move, which converts the vibrations into electrical impulses.
- Those impulses send the sound information through your auditory nerve to your brain *(click)*

Slide 6

Now let's take a closer look inside the cochlea because this is where hearing damage from noise occurs *(click)*

This picture shows the hair cells I talked about that live in the inner ear. These are healthy hair cells - they are straight and stand in even rows next to each other. When loud noises make them move too vigorously, the hair cells can get damaged ... let me show you how that happens

(Do hair cell demonstration with pipe cleaners) (click)

The hair cells in this picture are like the pipe cleaners. They are bent and damaged and are no longer able to transmit sounds to the brain. The frequencies they represent are lost now – this person can't hear that type of sound anymore.

How do you think we can fix this? *(usually they will suggest being quiet for a while, or medicine or surgery)*

No, just like these pipe cleaners can't be straightened, this kind of hearing loss is permanent and cannot be fixed or cured.

Slide 7

That's why it is so important that we protect our ears so this doesn't happen to us! Here's a video about how we can protect our ears from loud noises. *(click play)*

Slide 8

So how loud is too loud? Here are some sounds that you might hear on the farm that are too loud for your ears and how long it is safe to be around them without hearing protection. *(talk through the sounds/time limits on the chart.)*

Slide 9

How are we going to protect our ears? Say it with me... *(click)*

- Turn it down – If it has a volume button/knob, turn it down *(click)*
- Walk away – If you don't need to be that close to the noise, move away *(click)*
- Protect your ears! – If you can't turn it down, and you can't walk away, use earmuffs or ear plugs to protect your ears. *(click)*

Any questions?

If there is time at the end, hand out practice ear plugs and let the kids practice rolling them. Give feedback. If you have a roll model, they can take turns trying their luck with that.