Say What?

Play It Safe With Your Ears. Play It Safe With Your Health.
Dear Student:

Noise is defined as any unwanted or disagreeable sound. Noise is all around you and may be polluting the environment where you live, learn, and play. Noise in your environment can become harmful when it interferes with your normal activities, such as sleeping or talking, or when it affects your health, such as your ability to hear.

There are sounds that you enjoy and may not consider to be noise, like the music of your favorite band or musician. When you listen to the music of your favorite band or musician, you may crank up the volume and listen to it for hours. This is when it can potentially become harmful. The louder the sound and the longer you listen to it, the more likely it is that damage will occur to your hearing.

Damage to your ears should not be your only concern. Noise can not only harm your hearing—it can also make it hard to concentrate while reading or doing homework, make you frustrated, prevent you from falling asleep, and make it hard to communicate with your family and friends. It is important that you learn about noise and how to identify when it is harmful to you and others.

There are steps you can take to protect your hearing and your health from the effects of loud sound, such as turning down the volume, wearing hearing protectors such as earplugs or earmuffs, and making your environment noise-free. This booklet will provide you with information on noise and steps to take to protect yourself from the harmful effects of noise.

You only have one pair of ears, so treat them well by protecting them from noise.

U.S. Environmental Protection Agency
Office of Air and Radiation
What happens inside the ear when you hear sounds?

Your ears are amazing instruments! Each ear is divided into three parts: the outer ear, middle ear, and inner ear. The three parts work together so you can hear sound.

- Hearing starts at the outer ear, which carries sound from the air through the ear canal to the eardrum.
- The eardrum vibrates, which causes three bones (malleus, incus, and stapes) in the middle ear to move mechanically.
- The middle ear sends mechanical vibrations to the inner ear (cochlea) where they are picked up by hair cells, which send electrical impulses to the brain.

The tiny hair cells in the inner ear are very important. Why? Because when those hair cells are damaged, they do not heal and can cause hearing loss. Think of hair cells as blades of grass. When you walk on grass the blades spring back up but if you walk over them too much, the blades stop springing back, and the grass flattens out. The same thing happens in your ears when you listen to sounds that are too loud for a long time—they may damage the tiny hair cells in your inner ears.
What Is Too Loud?

Sound is measured in units called decibels (des-uh-bels). The greater the number of decibels, the louder the sound and the more harmful it is to your ears. The sound thermometer gives you an idea of how loud some sounds are. If you are exposed to sound at 85 decibels and above, it may harm your hearing.

Sound Thermometer
(courtesy of Dangerous Decibels)

- 180: Rocket Launch
- 175
- 170
- 165
- 155
- 145
- 135
- 125
- 115
- 105
- 95
- 85
- 75
- 65
- 55
- 45
- 35
- 25
- 15
- 5
- 0

- Softest Sound You Can Hear
- Whisper
- Rainfall
- Talking Normally
- Garbage Truck
- Roar of Crowd at Sporting Event
- Gas Lawn Mower
- Busy City Traffic
- Washing Machine, Vacuum Cleaner
- Stereo Headphones (with the volume turned up)
- Rock Concert, Thunderclap
- Police Siren, Jack Hammer
- Airplane (from 100 ft.)
- Fireworks, Gunshot
- Rocket Launch
Noise is everywhere—at home, school, and even at fun activities—and some noise can reach potentially damaging levels. As you learned earlier, too much noise can be bad for you, and prolonged exposure to sound at 85 decibels and above can harm your hearing. If you can avoid noise that is too loud, you should, but if you have to be around noise that is loud, you should wear hearing protectors.

What are hearing protectors?
Hearing protectors are devices, such as earplugs or earmuffs, that are worn to reduce the level of sound entering your ears.

EARPLUGS are inserted into the ear canals, and EARMUFFS are worn over the ears. Both earplugs and earmuffs come in different styles, colors, and sizes. Be sure that your earplugs or earmuffs are child-size, to fit your ears or your head.

When should you wear hearing protectors?
Hearing protectors should be worn when you are exposed to sound that is 85 decibels and above. Use the sound thermometer on the previous page to judge the sound level of noise sources in your life.

Hearing protectors should be worn:

**At home**
- mowing the lawn
- around someone who is operating power tools

**At school**
- school band or band class
- sporting events, such as football or basketball games
- cheerleading competition

**At play**
- video games
- music concert
- fireworks show
- car races
- hunting
Think Quiet!

Noise can harm more than just your hearing; it can also cause harm to your health. While at home, school, or play, think quiet…to keep your ears and health from being harmed by noise.

While at home, noise can cause problems like:
- Trouble sleeping
- Headaches
- Trouble concentrating on your homework
- Difficulty hearing your family members

While at school, noise can cause you to:
- Have trouble concentrating
- Become frustrated when you can’t hear
- Not think clearly
- Have difficulty hearing your teacher and classmates

While at play, the sound is too loud if:
- You can’t hear the person next to you
- It shakes or vibrates your body
- You hear a ringing sound in your ears after exposure to loud sounds
Unscramble the letters below to find words that relate to sound and your hearing.

ACARNELA

IONES

AGAEDM

RMDARUE

ISTRTOCPOE

ITLENS

ETUQI

NUDDSSO

DOLU

HLACEOC

EUOATRER

EIDLECB
Test Your Noise Knowledge

Across

1. Sound is carried through the ear canal to the __________.

4. Earplugs and earmuffs are also known as hearing __________.

5. The greater the number of decibels, the __________ the sound.

9. Loud sounds can be __________ to your hearing.

10. Hair __________ do not heal once they are damaged.

12. Hearing starts at the __________ ear.

13. An __________ is a certified professional who evaluates how well you hear sound.

17. Each ear has __________ main parts.

18. __________ at 85 decibels and above can harm your hearing.

Down

2. __________ are hearing protectors that are inserted into the ear canals.

3. Sound causes the eardrum to __________.

6. Turn down the __________ on your television, video game, or music player.

7. The middle ear sends __________ vibrations to the cochlea.

8. Sound is measured in units called __________.

11. Any unwanted or disagreeable sound is defined as __________.

14. The three bones—malleus, incus, and stapes—are located in the __________ ear.

15. Homework and studying should be done in a __________ place.

16. __________ in the ears can be a sign that you have been exposed to loud sounds.

19. Noise can harm your hearing and your __________.

20. The cochlea is located in the __________ ear.
That’s Too Loud!

Sound at 85 decibels and above can harm your hearing. To prevent damage to your hearing, you should avoid prolonged exposure to loud sounds or wear hearing protectors when possible. Circle the 9 photos below that show activities that might produce sound at 85 decibels and above. Hint: use the sound thermometer to help identify the sound level.

- Listening to music on your music player.
- Birds singing in the trees.
- A clap of thunder.
- Mowing the lawn with a gas mower.
- A garbage truck emptying trash cans.
- Heavy traffic in the city.
- Whispering into your friend’s ear.
- Rain falling on your umbrella.
- A construction worker operating a jack hammer.
- Playing an electric guitar.
- Watching fireworks.
- Playing video games.
There are 20 words hidden in this word search that relate to sound and your hearing. Can you find them? Don’t forget to look up, down, forward, backward, and diagonal!

damage
decibels
eardrum
earplug
hair cells
hearing
inner ear
listen
loss
loud
middle ear
noise
outer ear
permanent
protection
quiet
sound
thermometer
traffic
whisper
You should see a doctor if you are experiencing any of the following symptoms on a regular basis:

- Asking people to repeat themselves
- Hearing ringing, roaring, or hissing sounds after exposure to loud sounds
- Noticing that the volume on the television or radio is not high enough
- Straining to understand a conversation

The type of doctor that you will see for help is one of the following:

**OTOLARYNGOLOGIST** [o-to-lar-en-ga-le-jist]
The otolaryngologist is a medical doctor who may look into your ears, nose, and throat, and give you medicine or recommend that you go to an audiologist for a complete hearing evaluation or rehabilitation (special training).

**AUDIOLOGIST** [o-de-a-le-jist]
The audiologist, a certified or licensed professional, may give you a complete hearing evaluation to measure your hearing abilities. If you have a hearing impairment, the audiologist will tell you how serious it is, what type it is, and what can be done to help you live with your hearing impairment. If you need it, the audiologist may recommend a hearing aid and help you select one.
You Can Do It!

Start protecting your hearing and your health today!

- Homework and studying should be done in a quiet place.
- Turn down the volume on your television, video game, radio, and music player.
- Walk away from sound that is too loud.
- Wear hearing protectors while attending or participating in loud activities.
- Inform your parents or teacher when you are having difficulty hearing.
- If you hear a ringing sound in your ears after exposure to loud sounds, please tell your parents.
- Teach classmates, friends, and family about noise.

List other things you can do:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

To learn more, visit www.epa.gov/air/noise.html

Other Resources:
www.cdc.gov/healthyyouth/noise
www.dangerousdecibels.org
www.hearingconservation.org
www.listentoyourbuds.org
www.noisyplanet.nidcd.nih.gov
a c a r n e l a unscrambles to ear canal.
iones unscrambles to noise.
agaedm unscrambles to damage.
rmdarue unscrambles to eardrum.
intrtocpoem unscrambles to protection.
itlens unscrambles to listen.
etuiq unscrambles to quiet.
 nudssod unscrambles to sounds.
dolu unscrambles to loud.
hlaceo unscrambles to cochlea.
euoatrer unscrambles to outer ear.
eyidlec unscrambles to decibel.
Cut out the bookmark below. Use it to mark your page and to remind you of the sounds that can be harmful and how to protect your hearing and health.

**What is Too Loud?**

Sound at 85 decibels and above can harm your hearing.

- Rocket Launch: 180 dB
- Fireworks, Gunshot: 175 dB
- Airplane (from 100 ft.): 170 dB
- Police Siren, Jack Hammer: 165 dB
- Rock Concert, Thunderclap: 160 dB
- Stereo Headphones (with the volume turned up): 155 dB
- Garbage Truck: 150 dB
- Rear of Crowd at Sporting Event: 145 dB
- Gas Lawn Mower: 140 dB
- Busy City Traffic: 135 dB
- Washing Machine, Vacuum Cleaner: 130 dB
- Talking Normally: 125 dB
- Rainfall: 120 dB
- Whisper: 115 dB
- Softest Sound You Can Hear: 0 dB

www.dangerousdecibels.com
Protect Your Hearing and Your Health!

Remember, not all sounds are harmful. But the louder the sound and the longer you listen to it, the more harmful it is to your ears and your health.

- Turn down the volume on your television, video game, radio, and music player.
- Walk away from sound that is too loud.
- Wear hearing protectors when needed.
- Tell your parents, a trusted adult, or a teacher when you can't hear or if you hear a ringing sound in your ears after exposure to loud sounds.

Visit www.epa.gov/air/noise.html for more information.