

# Say What?

Play It Safe With Your Ears. Play It Safe With Your Health.



For Middle  
School Students



# Keep Your Hearing Healthy

*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.*

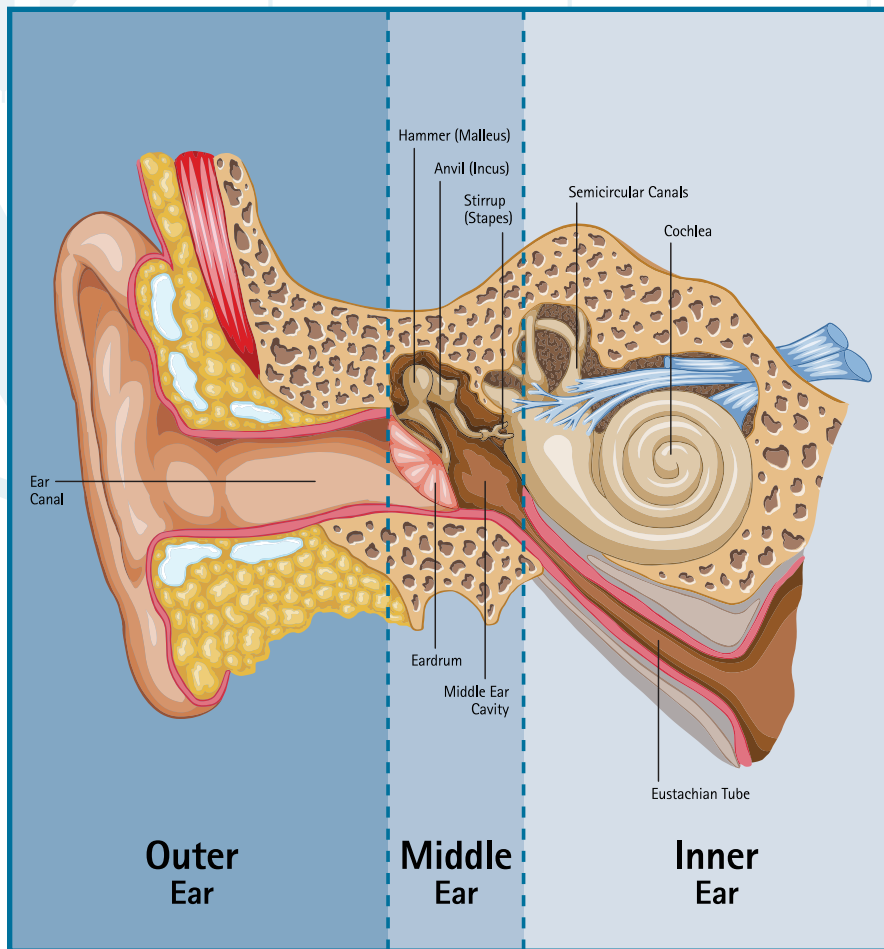
*There are steps you can take to protect your hearing and your health from the effects of loud sound, such as turning down the volume, wearing hearing protectors such as earplugs or earmuffs, and making your environment noise-free. This booklet will provide you with information on noise and steps to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

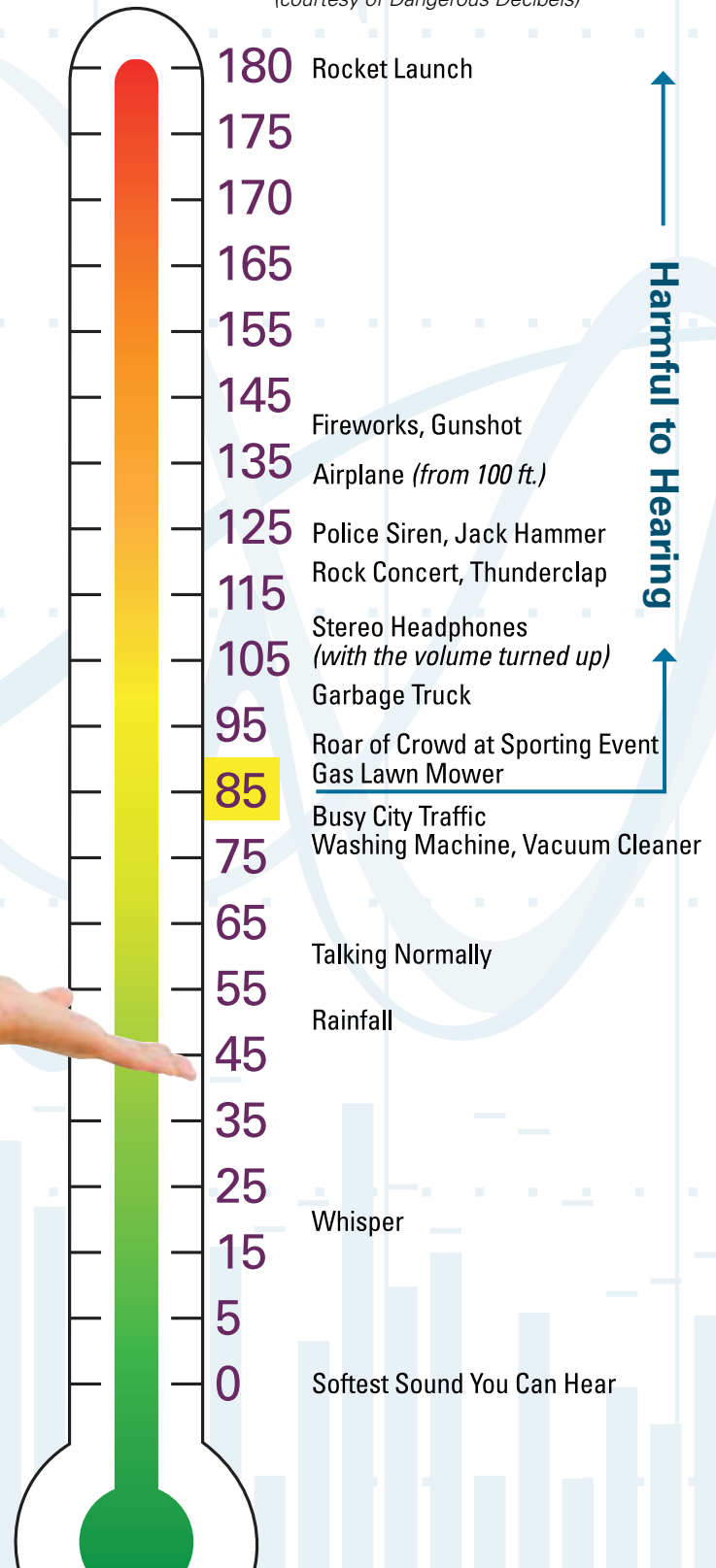


# What Is Too Loud?

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*)





# Protect Your Hearing!

**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



Earplugs



Earmuffs

# 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.

+24dB



## **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

# Word Scramble

Unscramble the letters below to find words that relate to sound and your hearing.

ACARNELA

\_\_\_\_\_

IONES

\_\_\_\_\_

AGAEDM

\_\_\_\_\_

RMDARUE

\_\_\_\_\_

INTRTOCPOE

\_\_\_\_\_

ITLENS

\_\_\_\_\_

ETUQI

\_\_\_\_\_

NUDSSO

\_\_\_\_\_

DOLU

\_\_\_\_\_

HLACEOC

\_\_\_\_\_

EUOATRER

\_\_\_\_\_

EIDLECB

\_\_\_\_\_

# Test Your Noise Knowledge

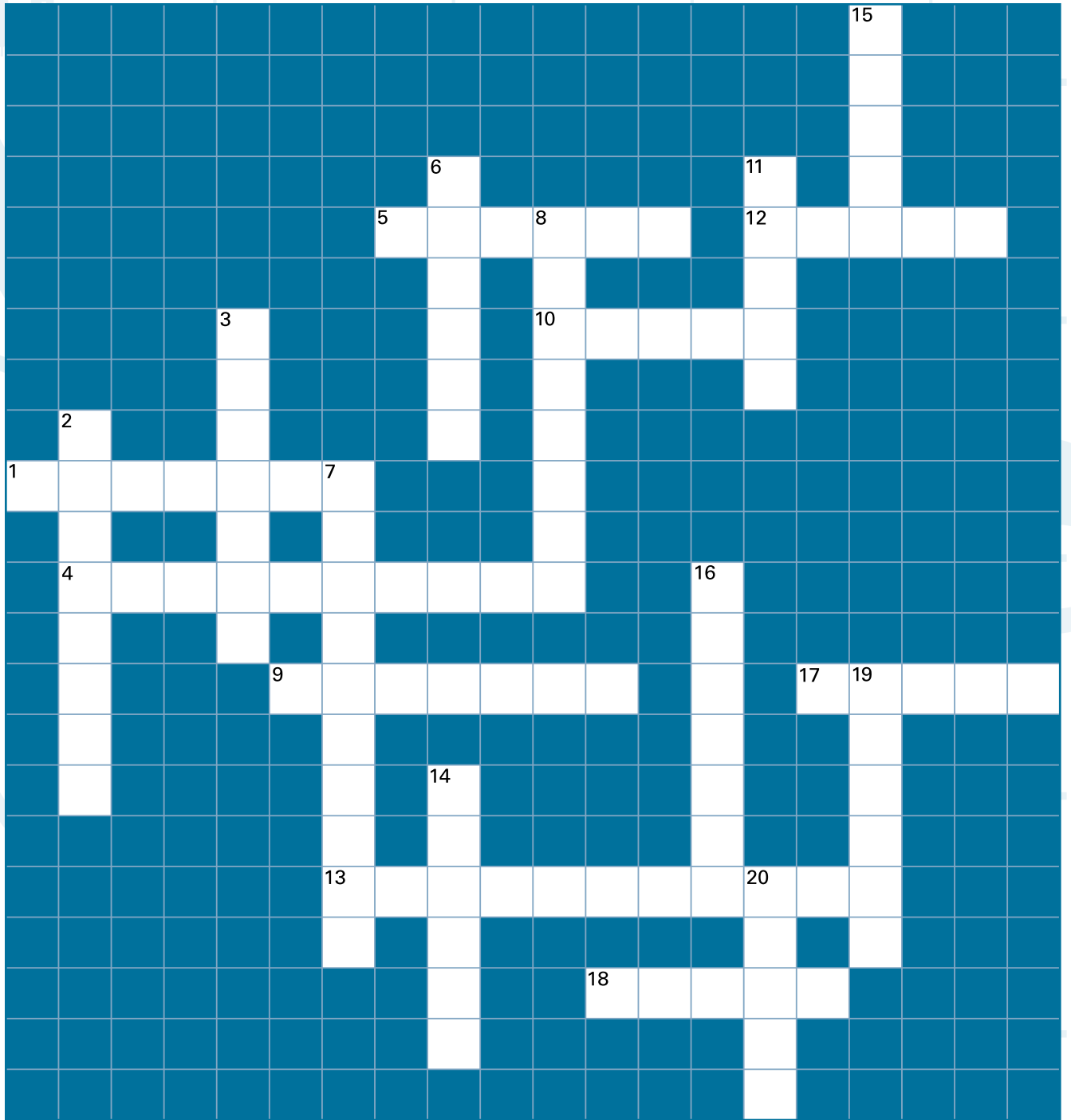
## Across

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 friends ear.



Rain falling on your umbrella.



A construction worker operating a jack hammer.



Playing an electric guitar.



Watching fireworks.



Playing video games.

# Word Search

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

# When Should You See A Doctor?

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:

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**To learn more, visit**  
**[www.epa.gov/air/noise.html](http://www.epa.gov/air/noise.html)**

### **Other Resources:**

[www.cdc.gov/healthyyouth/noise](http://www.cdc.gov/healthyyouth/noise)

[www.dangerousdecibels.org](http://www.dangerousdecibels.org)

[www.hearingconservation.org](http://www.hearingconservation.org)

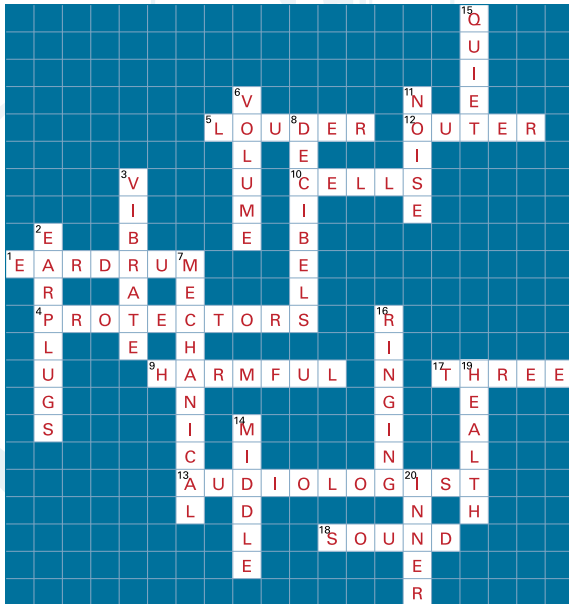
[www.listentoyourbuds.org](http://www.listentoyourbuds.org)

[www.noisyplanet.nidcd.nih.gov](http://www.noisyplanet.nidcd.nih.gov)






# Game Answers



A	P	E	R	M	A	N	E	N	T	G	F	R	B	Y	C	W	O
C	B	L	P	G	M	J	Y	Z	L	O	E	A	C	P	A	S	U
D	S	L	L	E	C	R	I	A	H	G	I	E	K	R	R	P	T
M	I	O	T	O	F	D	G	F	N	T	B	R	V	O	O	M	E
D	V	B	U	I	L	N	O	I	S	E	M	E	P	T	R	L	R
R	U	H	N	N	A	F	G	X	R	M	Z	N	F	E	D	G	E
D	S	O	A	J	D	Q	U	N	T	U	R	N	E	C	A	J	A
R	U	F	L	B	A	C	L	R	Z	Q	U	I	E	T	W	C	R
E	Z	K	J	Y	M	G	P	O	M	A	Q	B	I	I	T	D	R
T	C	E	M	L	A	F	R	E	P	S	I	H	W	O	Y	E	S
E	V	Y	I	P	G	C	A	F	T	C	A	K	M	N	O	C	P
M	O	E	T	G	E	A	E	U	O	H	D	N	E	T	S	I	L
O	E	F	A	A	C	Q	S	K	D	E	H	H	R	S	L	B	D
M	M	Q	N	R	A	R	L	M	N	A	Z	P	O	B	E	E	T
R	K	M	I	D	D	L	E	E	A	R	R	L	M	I	H	L	B
E	J	G	F	T	D	R	W	F	T	I	D	K	G	P	H	S	R
H	H	V	R	F	P	B	U	L	G	N	B	J	T	R	A	C	W
T	C	D	H	E	I	T	C	M	Y	G	C	I	F	F	A	R	T

- ACARNELA E A R C A N A L
- IONES N O I S E
- AGAEDM D A M A G E
- RMDARUE E A R D R U M
- INTRTOCPOE P R O T E C T I O N
- ITLENS L I S T E N
- ETUQI Q U I E T
- NUDSSO S O U N D S
- DOLU L O U D
- HLACEOC C O C H L E A
- EUOATRER O U T E R E A R
- EIDLECB D E C I B E L

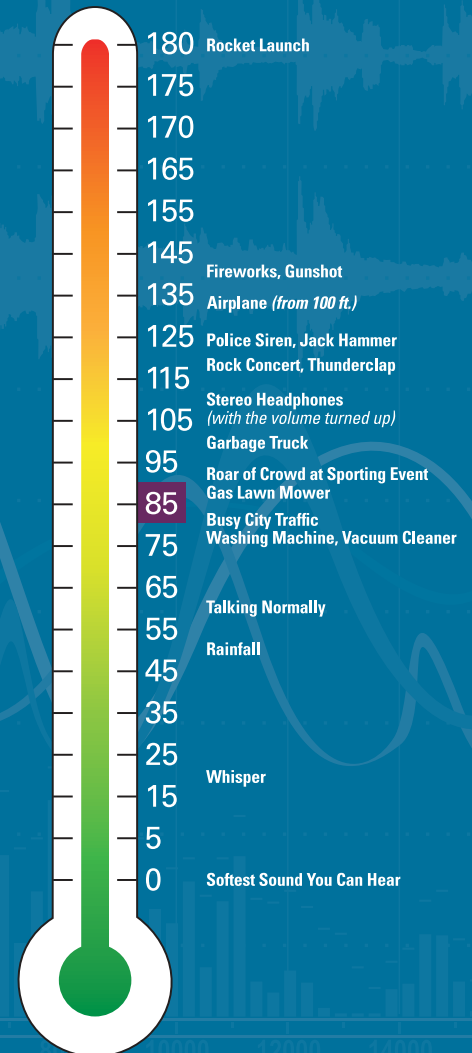
Cut out the bookmark below. Use it to mark your page and to remind you of the sounds that can be harmful and how to protect your hearing and health.

 Cut along the dotted line.



## What is Too Loud?

Sound at 85 decibels and above can harm your hearing.



## 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](http://www.epa.gov/air/noise.html) for more information.

