
Lesson At A Glance

| | |
|-------------------------------------|---|
| Length | 60 minutes |
| Learning Objectives | Students will: <ul style="list-style-type: none">• identify the parts of the ear• explain how noise levels can damage the ear• recognize damaging noise levels |
| Teaching Strategies | <ul style="list-style-type: none">• transparencies• cooperative groups• questioning• class discussions• group presentations |
| Equipment/Instructional Aids | <ul style="list-style-type: none">• spaghetti -cooked and raw (optional)• Student Handouts (photocopy for students in class)• overhead projector and screen• overhead transparency (produce from print copy) |
| Assessment Strategy | <ul style="list-style-type: none">• worksheets• estimation activity• presentation |

Purpose

This module is designed to help students understand the damaging effects of noise levels.

Learning Objectives

Students will be able to:

- identify the parts of the ear
- explain how noise levels can damage the ear
- recognize damaging noise levels

Duration

60 minutes

Instructional Materials

Overhead Transparency

(produce print copy into overhead transparency)

1. Inner Ear Photos

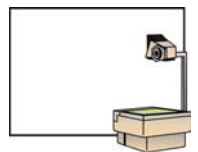
Student Handouts

(photocopy for students)

1. Ear Anatomy Information
2. Ear Anatomy Worksheet
3. How Noisy Is It?
4. Rules of Thumb

Equipment

1. Overhead Projector and screen
2. White board or flipchart and paper
3. Markers



Note to Teacher



Noise Induced Hearing Loss:

Loud noise can cause a permanent hearing loss. Research from industry and on animals indicates that prolonged exposure to sound over 85 dB can cause permanent hearing impairment. The more intense the noise, the less exposure needed to receive a damaging dose. In our society, it is commonplace for recreational and workplace sounds to be at damaging levels.

Hearing Loss in the Classroom

Research shows that 6 per 1000 school children have some degree of hearing loss. Hearing loss can be from various causes such as ear disease (e.g. ear infections), congenital (born with it), or trauma (e.g. head injury). Some students with hearing loss are assisted by hearing aids.

Students' sensitivity to discuss their hearing loss and hearing aids varies greatly. Your attitude can set a positive model for children in the class.

For those students with a hearing loss, it is very important that they don't lose any additional hearing due to noise damage. Their hearing protection needs may be more specialized than those of someone with normal hearing. Their audiologist or WCB Hearing Conservation section are good resources for them to get expert advice on hearing protection.

Classroom Noise

Communication is difficult in noisy environments. A quiet classroom environment helps children with normal hearing as well as children with a hearing loss or hearing aids. Some ways you can reduce the noise in your classroom are:

- use carpeting, underpadding, or place tennis balls on chair and desk legs to reduce noise
- close the classroom door to reduce outside noise
- for younger grades, use the Hear It, Think It, Do It Drill. (You may wish to assign a child per day to monitor noise levels of children in the classroom and use the drill when necessary)
- be aware that some areas of the school may be particularly difficult for students with a hearing loss, i.e. gymnasium, cafeteria, auditorium, playground, shop or band class, school bus.

Introduction

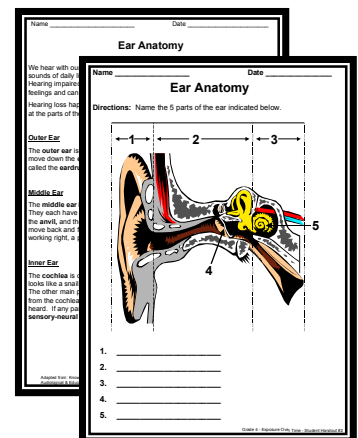
Ask

Did you know that 6 in 1000 school children have some degree of hearing loss?

Discuss

We are going to learn about the parts of the ear.

Distribute Student Handout #1 and 2 to students.

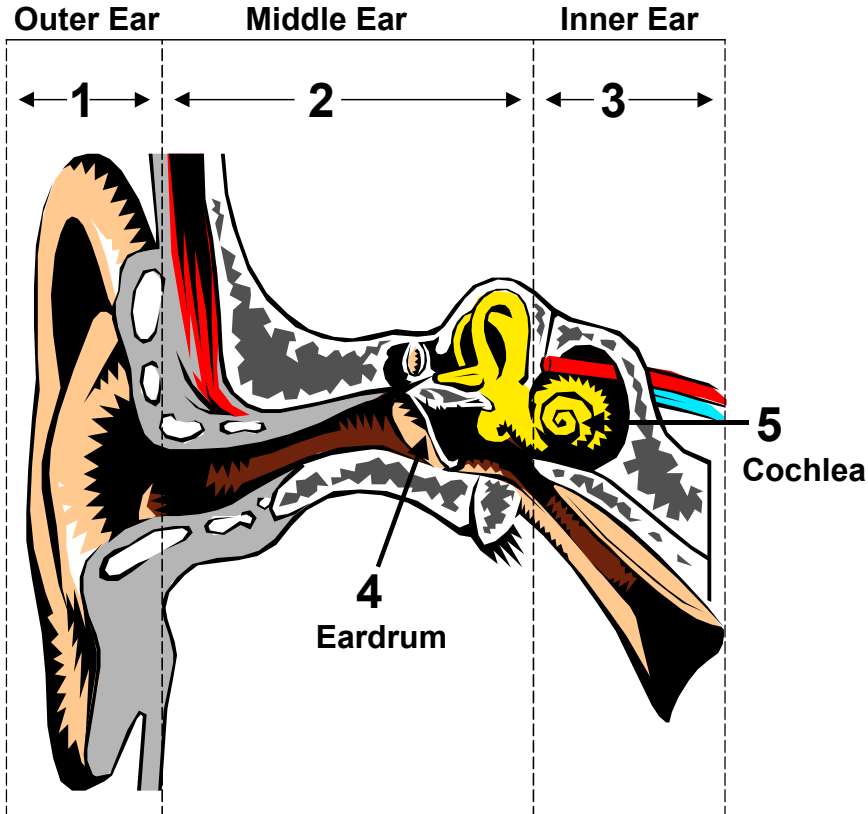


Ask students to read and complete the worksheet (handout), working individually, in pairs or in small groups.

Review answers with students per Answer Key below.

Ear Anatomy - Answer Key

Directions: Name the 5 parts of the ear indicated below.



1. Outer Ear
2. Middle Ear
3. Inner Ear
4. Eardrum
5. Cochlea

Spaghetti Ears (optional)

Discuss

We are going to use pasta as a visual aid of noise damage to the inner ear hair cells or nerve endings.

Raw or hard spaghetti = normal nerve endings

- These pieces of spaghetti are like the hair cells in your cochlea. They vibrate or move with pressure.

Cooked or soft spaghetti = damaged nerve endings

- These pieces of spaghetti are like hair cells that have been damaged by noise. They are limp (damaged) and do not respond to pressure changed any longer.

Key Point: After nerve endings are “cooked” by noise, they never go back to normal.

Noise Destroys Learning Activity

Ask

How do we hear sounds?

Explain

Sound waves move down the ear canal and through the ear drum and middle ear. Then the sounds are picked up by the nerve endings or hair cells in the inner ear. The nerve endings send the message along the hearing nerve to our brain. The brain tells us what we are hearing.

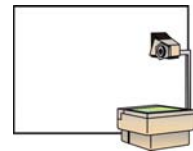
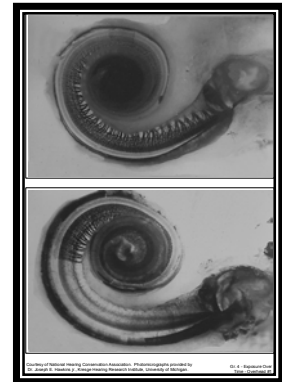
Display Overhead #1 to class.

Ask students what the difference between the two photos are. Then ask what they think caused the damage?

Elicit responses from students.

Suggested Responses:

- The hair cells or nerve endings of one inner ear have been destroyed.
- This was caused by noise damage. This damage is permanent and invisible (gradual with no pain or bleeding).



Comment

The intensity of vibration or loudness is measured in units called “decibels” (dBA).

For hearing damage to occur, there would have to be 8 hours of exposure to noise at 85 dBA.

For example, a soft whisper registers about 20 dB while an air raid siren measures as high as 140 decibels.

Divide students into group of 3 or 4.

Distribute Student Handout #3 to groups.

Ask each group to review the handout and estimate the noise level of the sounds indicated on the handout. Answer Key below.

| Name(s) | | Date | |
|--|-----------------------------|---------------------------|--|
| How Noisy Is It? | | | |
| Directions: Estimate the noise level of the following sounds and record your response in the first column. Some clues are given for comparison. | | | |
| Sound | Estimate Decibel Level (dB) | Actual Decibel Level (dB) | |
| Leaves rustling | 10 dB | | |
| Soft whisper | | | |
| Refrigerator | | | |
| Ordinary speech | 60-65 dB | | |
| Window air conditioner | | | |
| Blender | | | |
| Noisy restaurant | | | |
| Busy traffic | | | |
| Alarm clock | | | |
| Screaming child | | | |
| Live rock music | | | |
| Jackhammer | | | |
| Motorcycles (driver's seat) | | | |
| Rifle firing | | | |
| Rocket launching | 180 dB | | |

Teacher's Answer Key

| Sound | Estimate Decibel Level (dB) | Actual Decibel Level |
|-----------------------------|------------------------------------|-----------------------------|
| Leaves rustling | 10 dB | 10 |
| Soft whisper | | 30 |
| Refrigerator | | 50 |
| Ordinary speech | | 60-65 |
| Window air conditioner | 60-65 dB | 60-70 |
| Blender | | 65-85 |
| Noisy restaurant | | 70-75 |
| Busy traffic | | 80 |
| Alarm clock | | 70-100 |
| Screaming child | | 90-115 |
| Live rock music | | 90-130 |
| Jackhammer | | 100 |
| Motorcycles (driver's seat) | | 100 |
| Rifle firing | | 120-140 |
| Rocket launching | 180 dB | 180 |

Ask each group to present 3 or 4 of their estimates with class.

Class Discussion

What are some ways we can protect our hearing?


Suggested Responses

- avoid loud noises
- turn the volume down
- monitor length of time you are exposed to noise
- wear ear plugs or ear muffs

Conclusion






Distribute Student Handout #4. Read each item on the handout to the class.



**Rules of Thumb**

Sounds could be a noise hazard if:

- at arm's length from someone, you have to speak loudly for someone to hear you over the noise or music
- you have ringing or buzzing sounds in your ears after exposure and sounds seem muffled



Always protect hearing when around loud sounds!