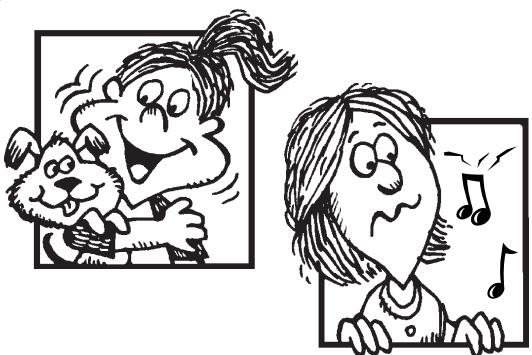


Noise and Your Ears: Worth Hearing About!



How does sound make you feel?

Unscramble these words:

HYAPP _____

DAS _____

GHENREDIFT _____

PSEYLE _____

TLEAR _____

CRATIPOTI _____

LADEXER _____

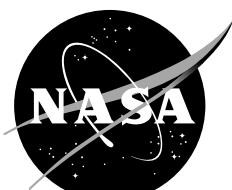
YONDENA _____

ADM _____

CEDITXE _____

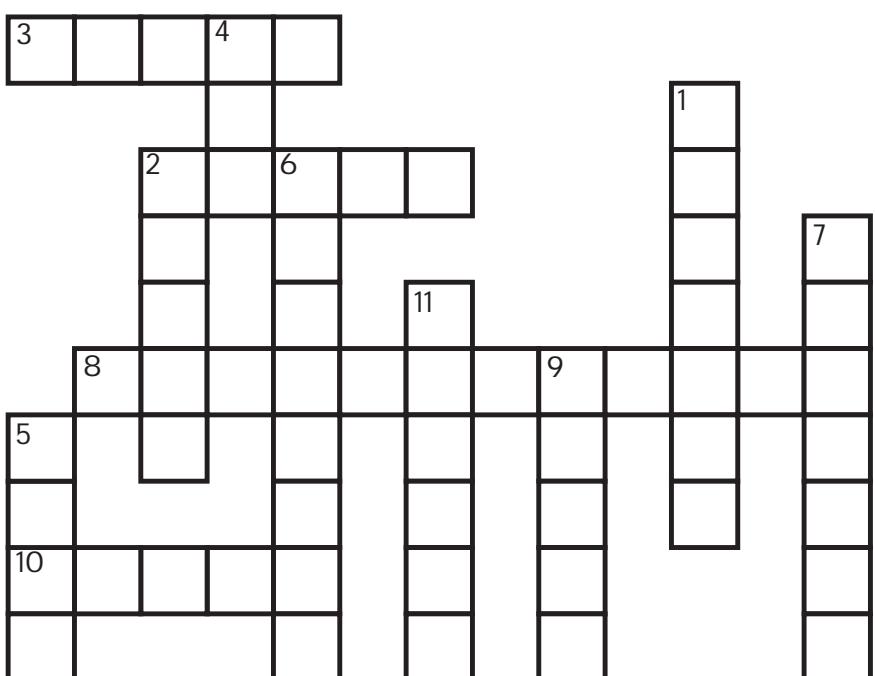
CEGINTERE _____

VITTOMEDA _____



National Aeronautics and Space Administration
Acoustical Testing Laboratory
Beth Cooper
216-433-3950
E-mail: Beth.A.Cooper@grc.nasa.gov

The Anatomy of Hearing Crossword Puzzle



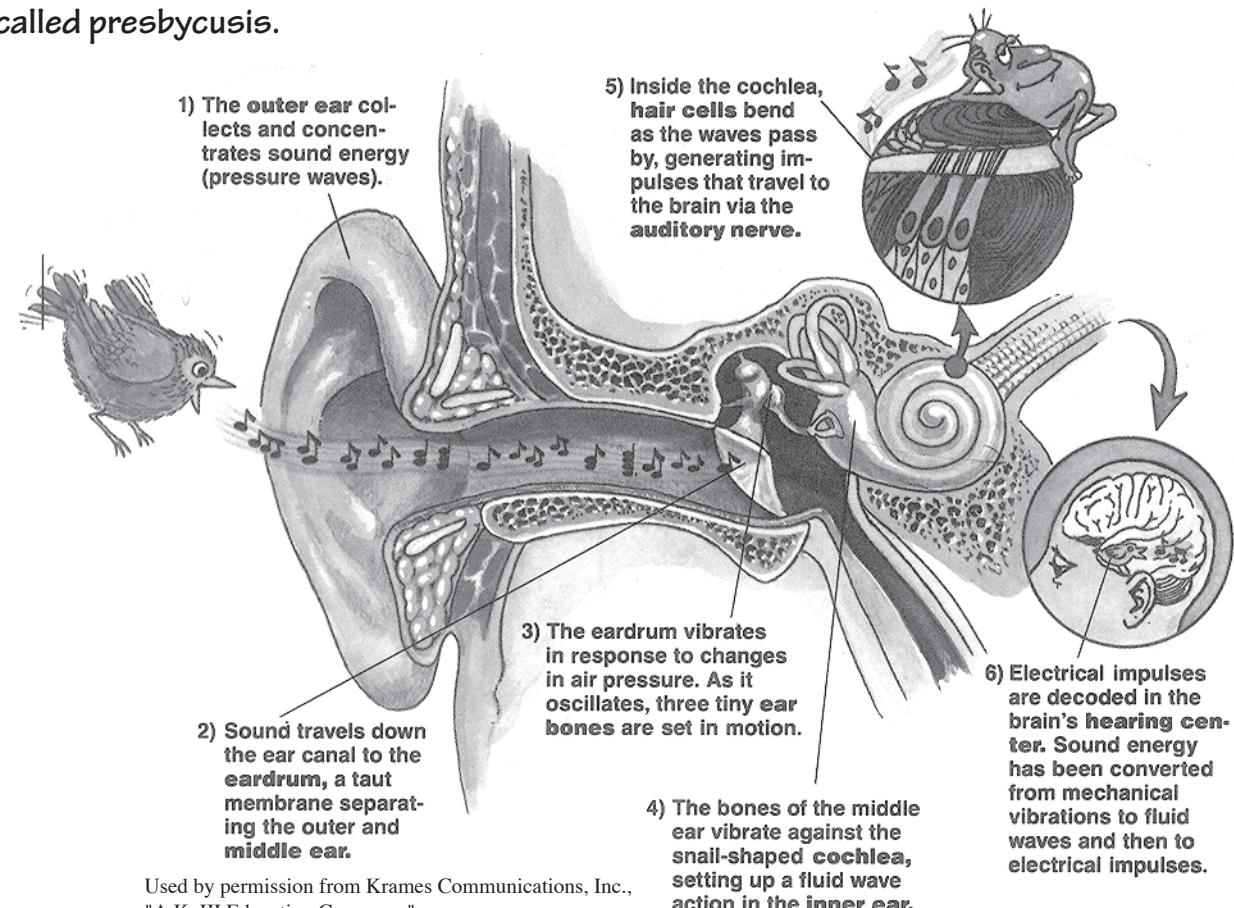
Across

2. Electrical impulses are decoded and interpreted as sound in the hearing center of the _____.
3. The _____ ear collects and funnels sound to the eardrum.
8. The inner ear contains a complex system of fluid-filled channels called _____ canals buried in the temporal bone.
10. Hair cells in the _____ ear respond to vibrations by generating electrical nerve impulses.

Down

1. The bones of the middle ear vibrate against the snail-shaped _____, setting up a fluid wave action in the inner ear.
2. As the eardrum vibrates, three tiny _____ are set in motion.
4. The _____ is a complex organ that collects sound energy and changes it into electrical impulses the brain can understand.
5. Healthy inner ear _____ cells are the key to good hearing.
6. Inside the cochlea, hair cells bend as the waves pass by, generating impulses that travel to the brain via the _____ nerve.
7. The _____ is a taut membrane separating the outer and middle ear.
9. Sound travels down the ear _____ to the eardrum.
11. The _____ ear contains three tiny bones called ossicles.

The outer ear collects sound energy and funnels it into the middle ear where it is transformed into mechanical vibrations. These vibrations, or oscillations, enter the fluid-filled inner ear as undulating waves. It's in the inner ear that thousands of hair cells change the mechanical energy of the waves into electrical impulses that the brain interprets as sound. We start life with a fixed number of hair cells. As we age, they begin to die off naturally, resulting in hearing loss called presbycusis.

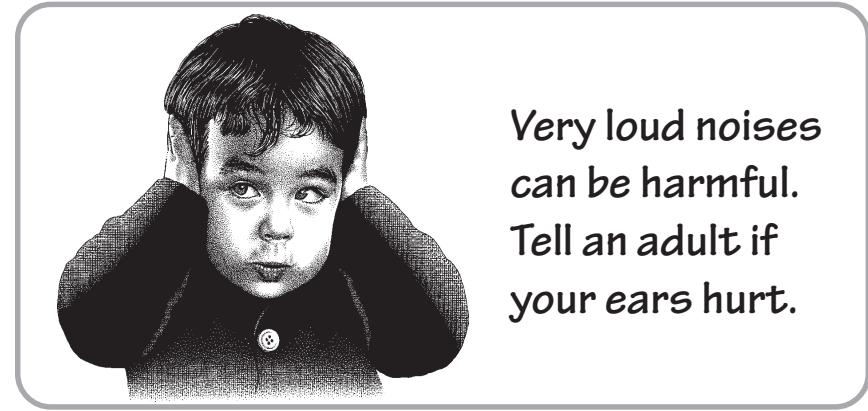


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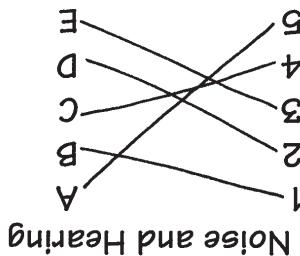
Noise and Hearing

Match these words with their definitions:

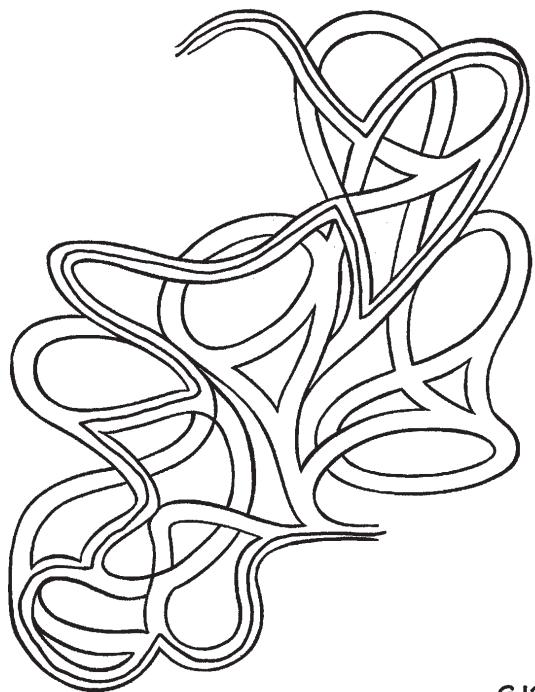
1. audiogram
 2. presbycusis
 3. tinnitus
 4. decibel
 5. noise
- A. Unwanted sound
 - B. A chart of your hearing thresholds (measured in decibels) for tones at different frequencies
 - C. Unit of measurement for sound intensity, or loudness
 - D. Hearing loss caused by the natural aging process
 - E. A constant noise (ringing, buzzing, or whistling) that originates in the inner ear



Very loud noises
can be harmful.
Tell an adult if
your ears hurt.



How does sound make you feel?
HAPPY SAD FRIGHTENED SLEEPY ALERT PATRIOTIC RELAXED ANNNOYED MAD EXCITED ENERGETIC MOTIVATED



✓

The Anatomy of Hearing

A crossword puzzle grid with the following words filled in:

- Across:
 - Row 1: RUM
 - Row 2: RUE
 - Row 3: RADAR
 - Row 4: DAD
 - Row 5: ARIEAL
 - Row 6: ALIEN
 - Row 7: LARVA
 - Row 8: READING
 - Row 9: EQUATOR
 - Row 10: MELT
 - Row 11: TENDER
 - Row 12: SIGHTED
 - Row 13: NATION
 - Row 14: OUDOM
 - Row 15: BIRDS
 - Row 16: INLAND
 - Row 17: LAWN
 - Row 18: NODDED
 - Row 19: DOLPHIN
 - Row 20: EARTHEN
- Down:
 - Column 1: MUM
 - Column 2: COULD
 - Column 3: CLOUT
 - Column 4: COULD
 - Column 5: COULD
 - Column 6: COULD
 - Column 7: COULD
 - Column 8: COULD
 - Column 9: COULD
 - Column 10: COULD
 - Column 11: COULD
 - Column 12: COULD
 - Column 13: COULD
 - Column 14: COULD
 - Column 15: COULD
 - Column 16: COULD
 - Column 17: COULD
 - Column 18: COULD
 - Column 19: COULD
 - Column 20: COULD

A hand-drawn crossword puzzle grid. The grid consists of a 15x15 grid of squares, with some squares containing letters and others being empty or marked with a diagonal line. Several words have been written across the grid:

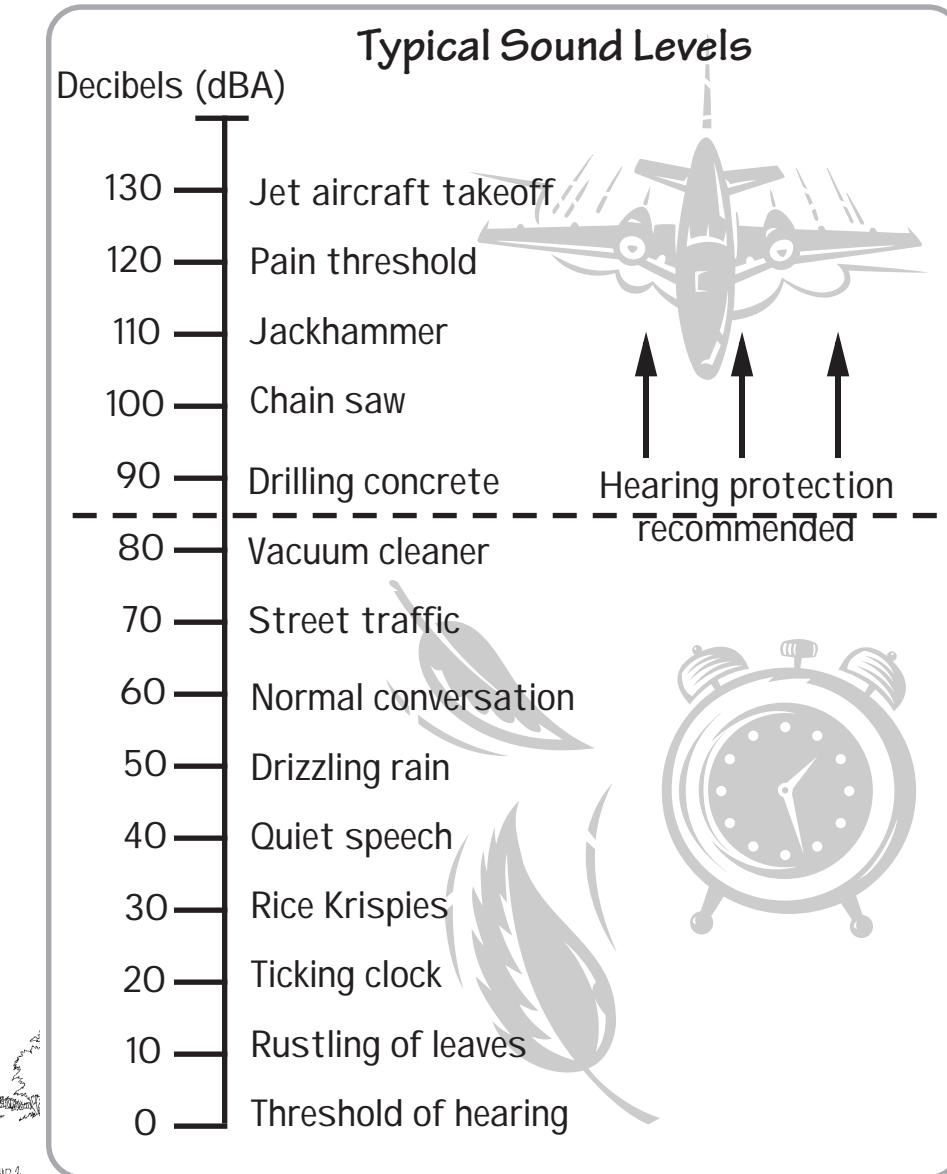
- Downward words:
 - Across 1: RUM
 - Across 2: RUE
 - Across 3: AERIAL
 - Across 4: LADY
 - Across 5: DODGE
 - Across 6: TUTOR
 - Across 7: SIGHTS
 - Across 8: ERASER
 - Across 9: MELT
 - Across 10: CELERY
 - Across 11: LUMBER
 - Across 12: CLOTHES
 - Across 13: HABITAT
 - Across 14: ARIAL
 - Across 15: NATION
- Upward words:
 - Down 1: AERIAL
 - Down 2: RUE
 - Down 3: LADY
 - Down 4: DODGE
 - Down 5: TUTOR
 - Down 6: SIGHTS
 - Down 7: ERASER
 - Down 8: MELT
 - Down 9: CELERY
 - Down 10: LUMBER
 - Down 11: CLOTHES
 - Down 12: HABITAT
 - Down 13: ARIAL
 - Down 14: NATION
- Diagonal words:
 - From top-left to bottom-right: RUM, RUE, AERIAL, LADY, DODGE, TUTOR, SIGHTS, ERASER, MELT, CELERY, LUMBER, CLOTHES, HABITAT, ARIAL, NATION.
 - From bottom-left to top-right: AERIAL, RUE, LADY, DODGE, TUTOR, SIGHTS, ERASER, MELT, CELERY, LUMBER, CLOTHES, HABITAT, ARIAL, NATION.

The Sounds of Noise

CHESERG / WHITTE

A black and white illustration featuring a large, intricate vine that dominates the frame. The vine's thick, winding stems and leaves cover most of the upper half of the image. In the lower right corner, a detailed landscape is visible, showing a small house nestled among trees and a body of water. On the far left, partially obscured by the vine, is a skull wearing a top hat and a trumpet, looking towards the right. The style is reminiscent of a children's book illustration.

Help Joe find a quiet
place to rest his ears



Familiar Sources of Noise Word Search

The Sounds of Noise

Match the scrambled sounds.

Match the scrambled sounds.

NBAG	THUMP
ZUBZ	POP
PUMTH	SCREAM
AKUSEQ	CHIRP
OPP	BANG
KACCR	SQUEAK
MESCAR	CRACK
RNGI	RING
TELIWSH	BUZZ
PHRIC	SCREECH
CHESERC	WHISTLE

Find and circle the words in the list.
Each is hidden horizontally, vertically,
or diagonally in a straight unbroken
line of letters that read forward or
backward.

MUSIC	AIRCRAFT
APPLIANCES	SNOWMOBILE
SIRENS	CAR
ALARMS	HEADPHONES
SAW	GUNSHOT
DRILL	RIFLE
LAWNMOWER	JACKHAMMER

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

Layout and design by Kelly Shankland.