

## Cats' Sense of Hearing

by Karen Commings

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When you call your cat, it often seems like he doesn't hear you at all, but a cat's sense of hearing is quite astute. A cat can hear sounds from 45 to 60,000 hertz as opposed to a human who can hear from 20 to 20,000 hertz. Even the canine who may be sleeping at your feet doesn't hear the upper ranges as well as your cat. Outshining cats' ability to hear are rodents, bats, whales, dolphins, seals, and some insects such as grasshoppers, locusts, moths, and lacewings. Because cats hear upper ranges of sound so well may explain why so many cat people talk to their cats in high-pitched voices to try to elicit a response.

But hearing a human caregiver call is not why evolution equipped cats with a superior sound detection system. Cats' ability to hear helps them detect prey who emit high-pitched sounds, such as mice and other rodents, and is especially important to wild cats who depend on hunting to survive. Superior sound detection enables a mother cat to hear and locate a kitten that has wandered too far. "A high-pitched call to a cat has more effect than a low pitch," says Drew Weigner, DVM, a board certified specialist in Feline Practice and Diplomate of The American Board of Veterinary Practitioners who founded The Cat Doctor in Atlanta, Georgia, "but if you're calling your cat, the response may depend on how sleepy he is."

A superior ability to detect sound helps not only in locating prey but also detecting predators and navigating the environment. Anyone who has lived with a blind cat knows that the cat can not only move around at ground level but can jump from one piece of furniture to the other assuming the furniture stays in a consistent place. "Hearing is the cat's second most important sense," says Dr. Weigner, "which is one of the reasons blind cats can get around well."

### The Ear

The ear is responsible for hearing and balance. A cat's ear consists of the external ear which includes the ear flap (pinna) and ear canal, the middle ear including the eardrum and auditory ossicles (small bones), and the inner ear which contains the semicircular canals to regulate balance and the cochlea and organ of hearing (Corti).

A cat can separately rotate the outer ear flaps (pinna) 180 degrees, each functioning like a mini-satellite dish that retrieves data to be analyzed by the cat's brain. "The pinna collect sound and amplify it," says Dr. Weigner. The delay in time that it takes for sound to reach one

ear versus the other helps them pinpoint the source. “They can differentiate sound direction from a meter away to within 8 centimeters,” says Dr. Weigner, “which makes a difference in locating prey.”

## The Science of Sonics

The frequency of a sound wave corresponds to its pitch - higher pitched sounds resonate with greater frequencies. Those frequencies above what a human can detect (greater than 20 kilohertz) are called ultrasonic sounds. Frequencies below what a human can hear (less than 2 kilohertz) are called infrasonic. A cat can hear ultrasonic frequencies to about 60-65 kilohertz. “The bigger wild cats bigger wild cats can detect infrasonic sounds,” says Dr. Weigner. “Part of lion's roar is infrasonic which enables them to communicate with each other.”

Many natural occurrences such as avalanches, earthquakes, volcanoes, and severe weather produce infrasonic sound. Whether the cat curled up on your hearth can detect impending natural disasters by hearing subsonic sound waves is unclear. “Infrasonic sound such as that in movies generates a feeling of impending doom or dread in people,” says Dr. Weigner. Although a cat may pick up on the human’s anxiety, detecting movement of some natural occurrences such as earthquakes may be more likely. “Cats generally don’t like ground movement,” says Dr. Weigner.

Ultrasonic devices to rid a house of fleas or other insects have become popular in recent years though no data exists to prove their effectiveness. A 1989 study by Purdue University concluded that the devices may cause hearing loss in cats and dogs. “Ultrasonic sound waves don’t go around objects, and if they are not loud, they probably won’t hurt a cat,” says Dr. Weigner.

If your cats leave the room when you turn on the stereo, the type of music as well as the volume might be the culprit. “If the music is played softly, they’ll hang out,” says Dr. Weigner. “There aren’t too many punk cats around.”

Hearing loss typically occurs gradually over time. If your cat loses its hearing, he or she may become overly attached or cry out more loudly than before. Snap your fingers behind each ear to help you detect if your cat has become deaf. If the cat doesn’t turn his head in the direction of your snapping, have him checked by a veterinarian. Deaf cats adapt, and some modifications, such as using hand signals, on your part will help your cat cope.

### **Sidebar: Tips for Dealing with a Deaf Cat**

Keep the cat indoors. Because deaf cats can’t hear traffic or dogs barking, they won’t know if they are in danger.

Use hand signals to call a cat or tap on the floor so the cat can detect vibrations.

Make sure the cat sees you before touching him. Deaf cats can be startled when they don't hear someone coming and may strike.

Rapidly turn a flashlight on and off to signal to the deaf cat.

Loud noises like hand claps or pursing the lips and making a sucking sound may be loud enough to get a deaf cat's attention.