

Bat “Vision”

Have you ever heard the saying “blind as a bat?” Bats’ eyes see just fine, probably as well as yours do! Unfortunately, bats feed at times when the light is pretty dim. Imagine trying to find food in your house in the middle of the night during a power outage without a flashlight. Your eyes probably wouldn’t be of much use. Luckily, most bats can also “see” with their ears!

All of Colorado’s bats navigate and capture their prey in the dark by means of “echolocation.” An echo is a reflection of sound. Location is the act of finding something.

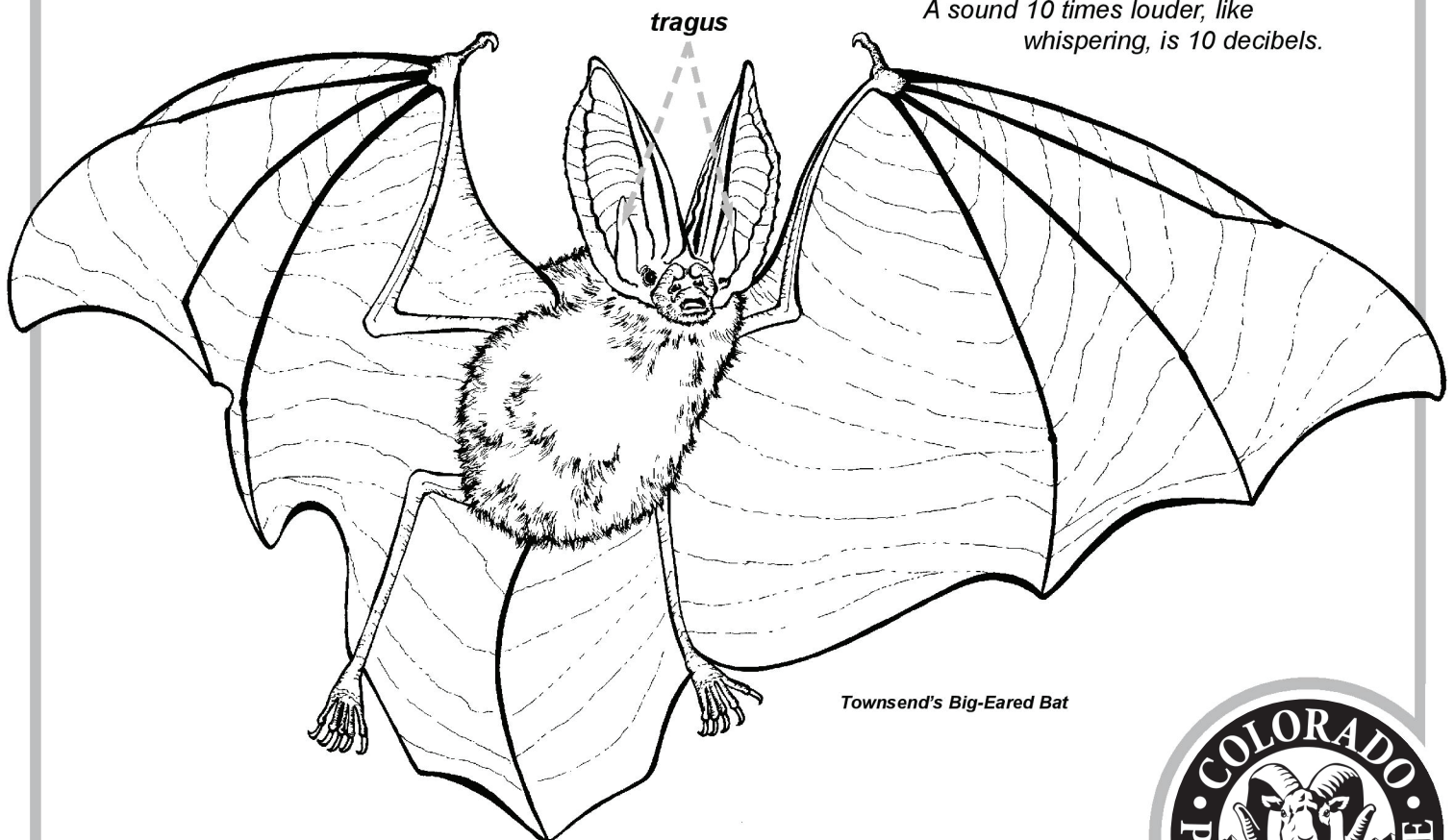
When hunting for insects, a bat sends out a series of high pitched squeaking and clicking sounds through its mouth or nose. The clicks and squeaks are ultrasonic—they are too high pitched for humans to hear. When the sound reaches an object, it is either reflected or absorbed by the object. Hard objects reflect sound as echoes. Soft objects absorb sound.

A bat knows when an insect is near because the sounds bounce off and return to the bat’s ears. Special grooves and a flap of skin called a **tragus** inside the bat’s ears help to channel the echoed sounds and tell the bat exactly where the insect is located. A bat’s hearing is so good that it can find insects that are no wider than a human hair! A mosquito doesn’t stand a chance!

Humans can’t hear a bat’s echolocation calls, but other bats can. To another bat, these sounds are earsplitting! Just as you would shout loudly to hear your echo in a cave or across a canyon, the bats are “yelling” as loud as they can when they echolocate. Their squeaks and clicks have been measured at 100 decibels!

You may be asking yourself, what’s a decibel? A decibel measures loudness. The decibel scale is a little odd because the human ear is incredibly sensitive. On the decibel scale, the softest sound that you might be able to hear, such as a mosquito flying a few feet away, is 0 (zero) decibels.

A sound 10 times louder, like whispering, is 10 decibels.



Townsend's Big-Eared Bat



A sound 100 times more powerful than near total silence is 20 decibels. A sound 1,000 times more powerful than near total silence is 30 decibels. So, the loudness of a bat's echolocation sounds is 10,000,000,000 times louder than near silence! If you could hear them, the sound would be quite deafening, about as loud as a smoke detector going off, a jackhammer, a snowmobile, or someone screaming right into your ear!

In humans, any sound above 85 decibels can cause hearing loss, so how come the bat doesn't become deaf? Luckily for the bat, it has special muscles that pull apart the small bones in its middle ear whenever it sends out signals. This stops most of the sound from deafening the bat. When it listens for the echo, the bat relaxes these muscles, and the small bones touch again to transmit the sound into the inner ear to be heard.

Most bats roost by hanging from their toenails. Bats' knees face backward so that their toes can grip the tree or cliff that they rest on. The tendons in bats' feet are designed to tighten the grip of their toes and lock them into place when the bats' entire weight is suspended from them. Once they are "locked-in," bats may fall asleep without danger of falling.

Big Brown Bat

