

For Creative Minds

This For Creative Minds educational section contains activities to engage children in learning while making it fun at the same time. The activities build on the underlying subjects introduced in the story. While older children may be able to do these activities on their own, we encourage adults to work with the young children in their lives. Even if the adults have long forgotten or never learned this information, they can still work through the activities and be experts in their children's eyes! Exposure to these concepts at a young age helps to build a strong foundation for easier comprehension later in life. This section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities for use at home or in the classroom, interactive quizzes, and more are available online. Go to www.ArbordalePublishing.com and click on the book's cover to explore all the links.

Sound Waves



Sound starts with movement. A molecule vibrates—it moves quickly back and forth. It bumps the molecule next to it and sets it vibrating. Molecules of air around them move. The vibration spreads away from the starting point in waves, like when you drop a pebble in water.

Inside ears are tiny hairs, too small to see without a microscope. When a sound wave touches them, they vibrate. The brain understands the vibration as sound.

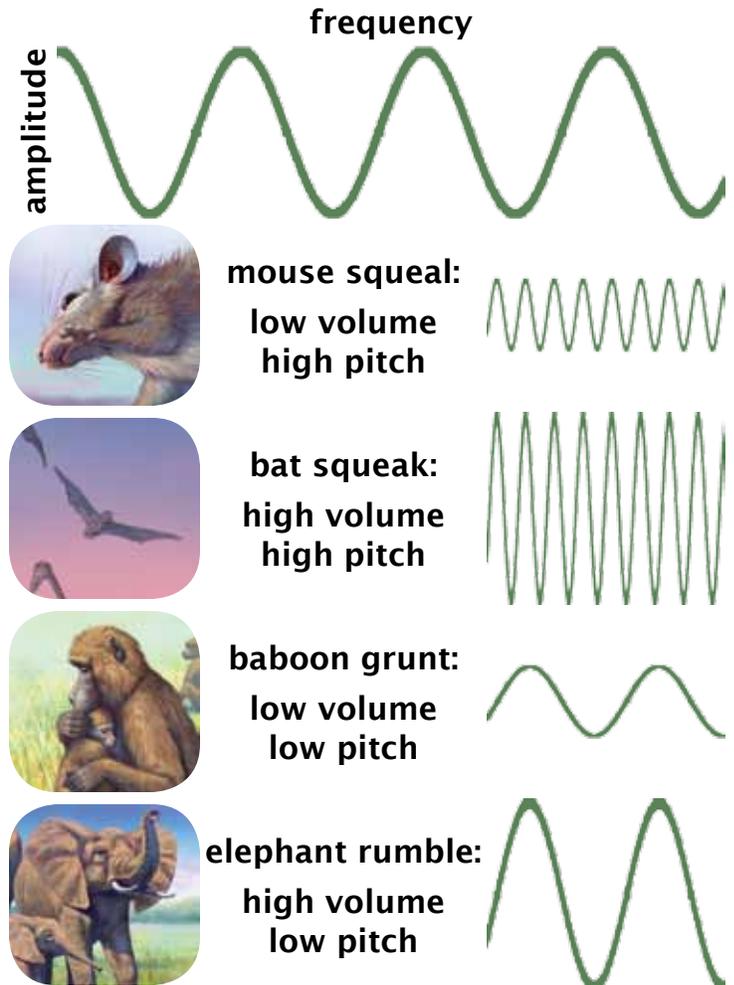
As the sound moves out from its starting point, the vibrations make a wave pattern. Waves have two characteristics: amplitude and frequency.

Amplitude is the height of a wave. In sound waves, this is the **volume**. Volume tells how much vibrational energy is in a sound. High-volume sounds are loud. Low-volume sounds are quiet.

Frequency is the distance from the top (peak) of one wave to the top of the next wave. This is a sound's **pitch**. High-pitched sound is made when the particles vibrate very quickly and the waves are close together. Low-pitched sound is made when the particles move more slowly and the waves are spaced out.

All sound has both characteristics: high or low pitch and high or low volume. Look at these sound waves and think of the animals that make them.

What kinds of sound can you make?



Sound Experiments

Touch Vibrations

Talk or sing a song. Hold your hand in front of your mouth. Do you feel any movement or vibrations in the air? While you are talking or singing, use your fingertip to touch your cheeks, lips, tongue, teeth, throat, and collarbone.

Can you tell where the vibration is the strongest? That is where your sound starts!

Many animals, including humans, have vocal cords (vocal folds) inside the voice box (larynx), which is inside the throat. When you talk or sing, you push air up from your lungs. The air travels over the vocal cords. The muscles in the larynx move the vocal cords to control the pitch and volume of your sound.



Make Vibrations

For this experiment you will need:

- a piece of cardboard at least six inches across
- scissors
- rubber bands of different sizes: small and big, thick and thin
- a pencil

Cut a hole about three inches wide in your piece of cardboard. Wrap several rubber bands around the cardboard. Slide the pencil under the rubber bands to create a “bridge” that holds the rubber bands up off the cardboard. Pluck each rubber band over the hole in the cardboard.

What sounds can you make? Do different rubber bands make different sounds? Use your fingers to stretch the rubber bands tight over the hole. Does the sound change?



See Vibrations

For this experiment you will need:

- a metal mixing bowl
- plastic wrap
- salt
- things you can use to make noise

Place the plastic wrap over the bowl and pull it tight on all sides. Sprinkle a thin layer of salt across the plastic wrap.

Now, make some noise! Drum on the side of the bowl (not on the plastic) with your fingers or a spoon. Bang two metal objects together. Clap your hands.

Observe the salt. What sounds cause the salt to jump? What sounds have little or no effect?



High Squeaks, Low Rumbles

The pitch of sound an animal can make depends on the length of its vocal cords. Animals with large heads have long vocal cords and animals with small heads have short vocal cords. A bat has a small head. It has short vocal cords small enough to fit in its tiny throat. A bat's vocal cords are so small they can only vibrate quickly. Bats make only high-pitched sounds.

Bats are active at night (nocturnal). Bats are not blind, but when they hunt for insects in the dark, they rely on their sense of sound more than their sense of sight. As a bat flies, it makes a series of squeaks. The sound waves bounce off of nearby objects like trees, rocks, and insects. The bat's large ears turn to catch the echoes. The sounds that bounce back tell the bat about its surroundings. This process is called **echolocation**.



An elephant has a large head. That means it also has a large throat and long vocal cords. They can vibrate slowly and make low-pitched sounds. Elephants can also make high-pitched sounds by shortening their vocal cords with the muscles in their larynx. Long vocal cords let elephants make a wide range of sounds.

Elephants live in herds. They have more than 70 sounds they use to communicate with other elephants. They can scream, roar, snort, rumble, squeal, cry, trumpet and groan. Just like people have different voices, each elephant has its own rumble. This helps the herd recognize each other from a distance. The rumbles are very loud, but too low-pitched for humans to hear. An elephant's rumble can carry for miles.



Predator or Prey Sorting



A **predator** is an animal that hunts other animals. **Prey** is an animal that is hunted. Some animals are both predator and prey. Many predators quietly sneak up on the animals they are hunting. Some predators, like bats, use sounds to help them hunt prey.

Some prey animals make noise to scare off a predator or to warn other animals of danger. Others hide and stay quiet, hoping the predator won't notice them.

Sort the animals (below in **bold**) into predator, prey, or both. Answers are below.



1. A **python** slithers toward his next meal without making a sound. He wraps around a young monkey and squeezes tight before beginning to eat.
2. A **lioness** creeps silently through the long grass. She sneaks up on a gazelle and pounces.
3. A **yellow-winged bat** squeaks in the quiet, night air. The echo tells her a tasty mosquito is nearby.
4. A **zebra** sees a leopard lurking in the grass. He brays and stomps his feet to warn the rest of his herd.
5. A **spiny mouse** squeals in fear when the hungry owl swoops down to grab her.
6. A **milky eagle owl**'s soft feathers don't make a sound as she moves her wings. She sees a mongoose and dives to snatch it off the ground.
7. An **elephant** trumpets when she sees a pack of hyenas. The herd makes a tight group so the adults can protect the young elephants in the middle.
8. A troop of **baboons** is hunting a gazelle when one sees a lioness on the prowl. The baboon gives a loud alarm. The rest of the troop hears the warning and they scurry up a tree to safety.
9. A **wildebeest** does not see the lion, but she hears a baboon call that one is nearby. She stomps her feet and starts to run. The rest of the herd follows her away from the hunting lion.



Predator: python, lioness, yellow-winged bat, and milky eagle owl
Prey: zebra, spiny mouse, elephant, and wildebeest
Both predator and prey: baboon