

# Sounds Are HIGH

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# Sounds Are LOW

## Learning That All Sounds Are Made by Vibrations

Sound is a form of energy produced by vibrating matter. Vibrations are the only source of sounds. There are many ways by which a youngster can sense vibrations as sound is produced. For each of the following experiences, have the child describe what is felt, heard, and seen.

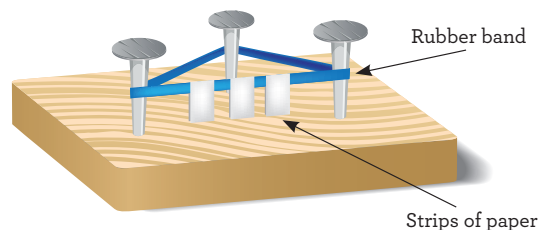
1. Fasten a rubber band to a door knob, pull it taut, then pluck it.
2. Touch the strings of a piano or stringed instrument as it is played.
3. Half-fill a drinking glass with water, wet a finger, then rub it around the edge of the glass to make a sound. (For consistent results, vinegar can be used in place of water. If the glass is steadied with one hand, hold it near the base. *Note:* Not all drinking glasses will produce a good sound.)
4. Place some rice, fine sand, or salt on a drum head, then tap the drum gently and with a steady beat. The drumhead will vibrate and cause the rice to jump around.

After these experiences the youngster should realize that whenever something moves back and forth or up and down, it is said to vibrate. From these and similar experiences, the child will realize that sound is produced by vibrations that are usually too rapid to see except as a blur.

## Observing Sound Vibrations

Sound vibrations are usually too rapid to be seen except as a blur. The following activities suggest some ways a youngster can more easily observe sound vibrations.

1. Stretch a rubber band tightly around three nails in a board. Hang several small strips of paper, creased in half and set over one section of the band. Pluck the section and observe how the paper strips move. Similarly, strips can be placed over the different strings of string instruments. The youngster can note how long a string vibrates after it can no longer be heard.



2. Place a drum on the speaker of a portable radio or CD player. You may need to tip the player so that the speaker faces up. Put some rice on the drumhead and turn the radio on. The vibrations from the speaker will travel to the surface of the drum, causing the drumhead to vibrate, causing the rice to bounce around.
3. Put a small mirror, reflective side up, on the surface of a drum set on a radio speaker. Darken the room and direct a small-beam flashlight or a laser pointer at the mirror so that the beam reflects onto a wall or the ceiling. Turn on the radio and observe that the beam jumps around due to the vibrations of the sound.

## Comparing Vibration Differences in the Pitch of Sounds

Place the tip of a spatula blade on a desk with the handle extending over the side. Hold the blade steady, pull the handle down, then let go. (A low rasping tone should be heard.)

Repeat the action several times, but each time slide more of the blade onto the table. Is the sound higher or lower? If the vibrating portion of the spatula is observed carefully, the youngster will note that as the off-the-table part of the blade is shortened, the handle vibrates

faster, and the faster the vibration, the higher the sound. If the blade is moved in the other direction, the blade vibrates more slowly and the sound is lower. The child might try counting the number of vibrations in one minute for different lengths of the spatula. In place of the spatula, other items can be tested: straightened-out bobby pins and wooden rulers. If a ruler is used, it can be clamped to the edge of the table, then systematically shortened for each trial.

