



# ACOUSTICS

## Good Vibrations

Music really *does* fill the air when sound travels from a source to the ears of a listener!

**Sound waves** are small variations in pressure, which travel from source to receiver. All sound carries **energy**, and familiar sounds such as speech and music carry information. Many sounds of speech (as well as singing) originate when the **vocal folds** (“vocal cords”) in our **larynx** vibrate due to passage of air from our lungs. Similarly, the lips of a trumpet player vibrate when air passes between them.

The energy carried by a sound wave can create electric signals in a **microphone** or can cause the **eardrum** to vibrate so that the sound can be heard in the ear. The number of sound waves that arrive each second is known as the **frequency** of the sound.

The noisy **vibrations** of the speaker’s (or singer’s) vocal folds and the trumpet player’s lips don’t sound familiar, however, until they are modified by passing through the throat and mouth of the speaker or the trumpet held against the player’s lips. The trumpeter

can change the effective length of the trumpet by means of valves, while the speaker (or singer) changes the **resonances** of the throat and mouth by means of throat muscles and especially the tongue.

**Acoustics** is the science of sound. **Acousticians** study how sounds are produced, transmitted and perceived. **Speech scientists** study how speech is produced, the acoustic signal that is produced, and how listeners understand speech. **Musical acousticians** study instruments of all types, from orchestra and band instruments to the singing voice and even electronic means of sound creation and control. All these sources give the composer and performer the **control** they need for artistic expression.

Want to learn more?  
[www.acousticsforkids.org](http://www.acousticsforkids.org)

make waves - discover science  
explore the science of sound and listen  
to a whole new world

