Sound Energy

What is sound?

Sound is a form of energy made by vibrations. When an object vibrates, it causes the air particles around it to move. These particles bump into the particles that are close to them, which in turn causes those particles to move and bump into more particles. This creates sound waves that keep going until they run out of energy.

Try this: Put your index and middle finger on your neck. Say the word “aah” as loud as you can. Then try it as soft as you can. You not only hear a sound, but you feel a movement inside your throat. When you say “aah,” your vocal cords vibrate. That means they move quickly back and forth. As your vocal cords vibrate, they produce sound. Source: http://www.fi.edu/fellows/fellow2/apr99/soundsci.html

Think about throwing a stone in a pool of water. You see rings of waves around where the stone hits the water. This is true for sound waves also. They spread out all around. The sound can be either noise or music. If the wave is irregular, noise is created. If it is regular, repeating waves, music can be the result.

Sound vibrations are able to travel through all forms of matter: gases, liquids and solids. These are called the medium. Sound cannot travel through a vacuum.

Sound is transmitted through gases, plasma and liquids as longitudinal waves, also called compression waves (mechanical longitudinal waves or pressure waves). When the vibrations are fast, you hear a high note. Whey they are slow, a low note is created. A longitudinal wave is moving in the same direction in which the particles of the medium vibrate.

Pitch is how high or low a sound seems. Birds have high-pitched tones and a lion’s roar is low-pitched.

Low-Frequency Sound Waves

High-Frequency Sound Waves

How do musical instruments create sound?

There are four types of musical instruments: wind, brass, string and percussion. In wind instruments (such as the flute or trumpet), vibrating air makes the sound. The air particles move back and forth creating sound waves. In instruments such as a clarinet, a vibrating reed (a thin piece of wood in the mouthpiece) starts the wave. The player gets different pitches by pressing the keys to open or close the holes. This makes the tube longer or shorter. Longer air passages create lower pitches.

String instruments are played by pressing down on the string and making longer or shorter strings. This causes the strings to vibrate at different frequencies and make different sounds. Shorter strings make higher sounds. Strings also produce different sounds, depending on how thick the strings are.

Percussion instruments such as drums and cymbals vibrate when they are hit, causing sound. Brass instruments make music by the user buzzing his or her lips while blowing.
Did you know?

- Sound travels four times faster through water than through the air. Whales in the ocean “sing” to each other. The sound of their song can travel a distance of 800 km.
- There’s no sound in space. Sound needs a medium to travel through.
- Sound travels through air at 1,120 feet per second or 340 meters per second.
- Geologists use their knowledge of how sound travels through rocks to help them find oil fields.
- When a sound wave hits soft material, much of the sound is absorbed. This material is called an insulator because it absorbs much of the energy of sound waves.
- Hard materials can reflect sound so that the sound travels back in the opposite direction. This is called an echo.
- One of the loudest sounds produced by our own invention is the noise of a space rocket blasting from the launch pad.
- When artists are in a recording studio, they don’t want any extra noise. The walls, ceilings and floors are covered with sound-absorbing substances, such as wavy-surfaced tiles and thick carpets.