Sound Waves

EMPACTS Project

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Introduction to Physical Science
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Teamwork

Having fun together
Sound is a travelling wave which is an oscillation of pressure transmitted through a solid, liquid, or gas, composed of frequencies within the range of hearing and of a level sufficiently strong to be heard, or the sensation stimulated in organs of hearing by such vibrations.
For humans, hearing is normally limited to frequencies between about 12 Hz and 20,000 Hz (20 kHz), although these limits are not definite.
• Sound waves exist as variations of pressure in a medium such as air.
• They are created by the vibration of an object, which causes the air surrounding it to vibrate.
• The vibrating air then causes the human eardrum to vibrate, which the brain interprets as sound.
Medium is whatever the wave is passing through.
Sound wave is a compressional wave

http://vimeo.com/1823806
• **P-waves** are type of elastic wave, also called seismic waves, that can travel through gases (as sound waves), solids and liquids, including the Earth. P-waves are produced by earthquakes and recorded by seismometers.

http://www.youtube.com/watch?v=_I7DPl65BLM
Frequency of Sound wave

• An audio frequency, or audible frequency is characterized as a periodic vibration whose frequency is audible to the average human.
All objects have a natural frequency at which they vibrate when struck, plucked, strummed or somehow disturbed.

The waves are all travelling at about the same speed, so this is the number of each wave that will reach the ear in a hundredth of a second.

Short wavelength means lots of waves; high frequency, high sound.

Long wavelength means fewer waves; low frequency, low sound.
The frequency of a sound wave is determined by the? 

- The sensation of a frequencies is commonly referred to as the **pitch** of a sound. A high pitch sound corresponds to a high frequency sound wave and a low pitch sound corresponds to a low frequency sound wave.
Different waves

- Amplitude
- Wavelength

(Amplitude is line density)
Waves
Compression
Longitude
Transverse
Surface
Compression Wave

- Increased Attraction
- Increased Dispersion
- Equalized Attraction & Dispersion

Harmonic Flow →
→ Enharmonic Flow

To and Fro Motion of Air Molecules
Direction of Propagation
Longitude wave

- **Amplitude**
- **Wavelength**
- **Propagation**
Transverse Wave

- Wavelength
- Crest
- Direction of travel
- Amplitude
- Trough
- Movement of water molecules

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Figure 1. Depiction of deep water waves (water deeper than 0.5 WL).
Answer your questions as we answer them.

1. Can sound travel without air?

2. How are sound waves like ocean waves?

3. Two ways to change the sound of instrument?
Sonic Bomb is breaking the speed of sound.
Video

- http://www.youtube.com/watch?v=-d9A2oq1N38&feature=related
Taking a break for just a minute
Morgan introduces the physics
Tara tells us about the materials
Max demonstrates how frequency is related to size of the medium.
References

- http://www.physicsclassroom.com/class/sound/u1l1a.cfm
- http://myweb.dal.ca/mkiefte/animations/sound_waves.gif