



**Science, Engineering,
Technology & Math**

Science of Sound

All About Sound

Week #1:

- What is Sound
- Explore Vibration
- Project: Create a drum (Visual cues of vibration/sound)

Week #2:

- Sound Waves
- Vibration and oscillation
- String Phone

Week #3:

- Wave Patterns
- Project: Frequency and Pitch

Week #4:

- Sound Travel
- Did you know?
- Project: The Singing Glass. (Wave example)

Week #5:

- Electric Sound Creation
- Project: Balloons and vibration with candy decoration and speaker

Week #6: Share projects

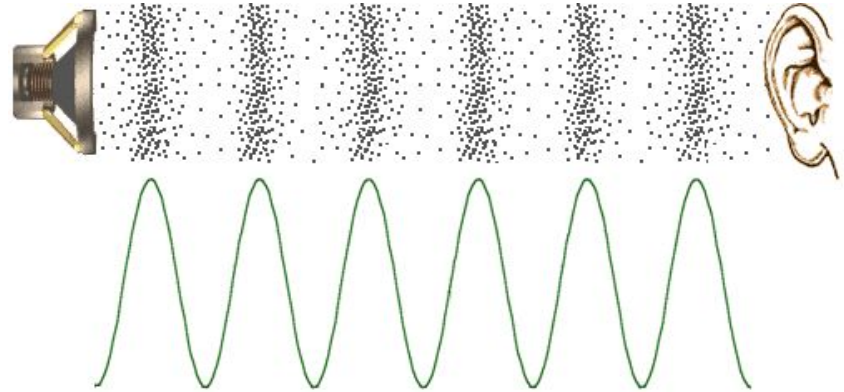
Week #1: Sound

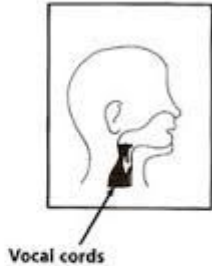
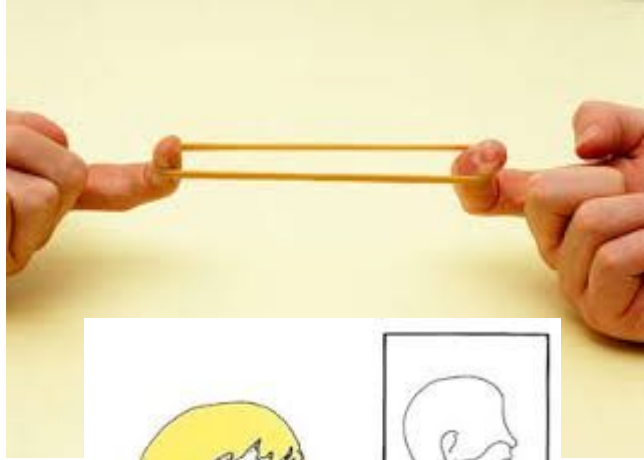


An invisible form
of energy

What is Sound??

Vibrations that travel through the air to your ear





Sounds are made by vibrations. Some vibrations are easy to see. For example, if you stretch out and twang a rubber band, you can see it moving back and forth.

Other vibrations are less obvious, but you can feel them. Try putting your hand around your throat and humming a tune.

Can you feel the vibrations? Those are your vocal cords moving rapidly back and forth. Without vibrations, the world would be silent.

So how do vibrations travel and get to your ears?



Fun Science :Sound
Charlieissocoollike

Creative Challenge:

Create a drum stretching the balloon over

top of can. Hit the top, cause it to **vibrate** and create sound waves.

Materials & Supplies

Small can
Balloons
Rubberband
Chopsticks/
Pencils
Rice

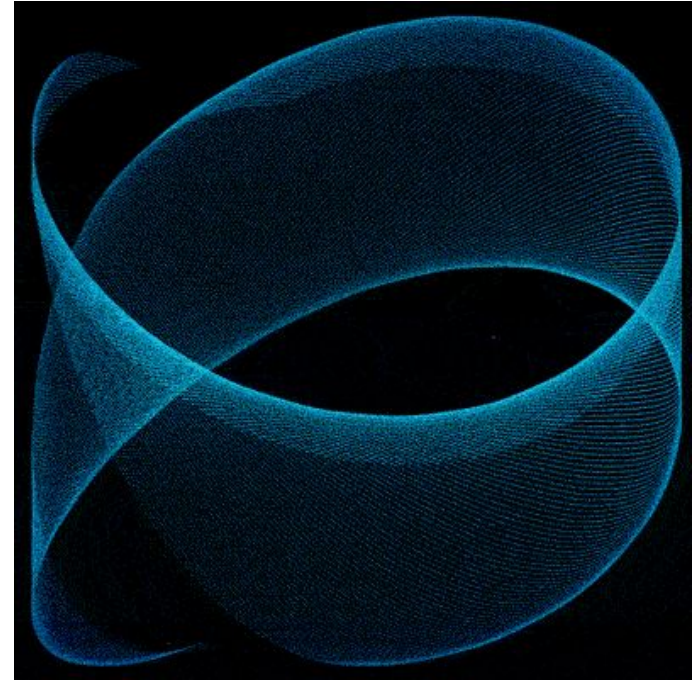
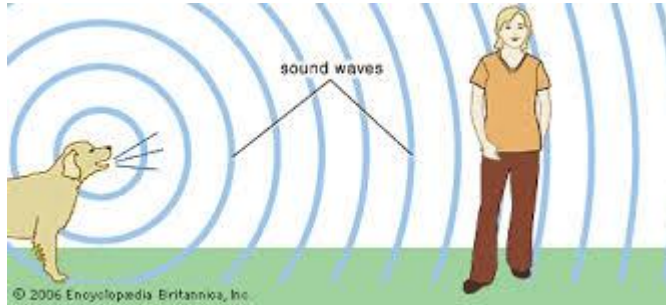


Week #2: Sound Waves

A Wave is a kind of oscillation, a disturbance that travels through space and matter.

Something that **oscillates** is something that "vibrates", or repeats the same pattern.

Wave motions transfer energy from one place to another

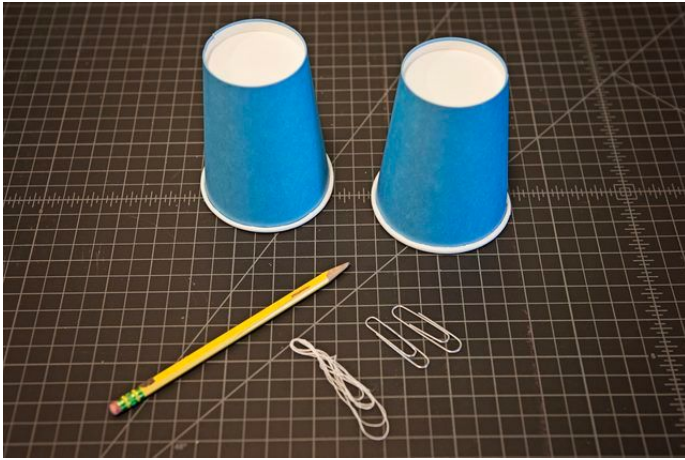


Try listening with a cup on a wall or door with your team mate. Can you hear the other person talking?



The sounds in the next room are transmitted through sound waves into the wall, which absorbs most of the vibrations. The glass can help you pick up the vibrations directly from the wall and amplify them straight into your ear.

Creative Challenge: String Cup



Materials:

Plastic Cups
String



Steve Spangle Science

<http://www.stevespanglerscience.com/lab/experiments/halloween-screaming-cup/>

Week #3

Wave Patterns

Wavelength

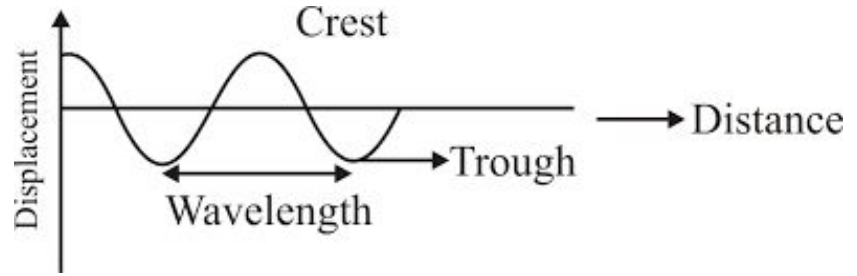
A wavelength is the distance between the high point of one wave to the high point of the next wave

Frequency

The frequency of sound is the rate at which the waves pass a given point, the number of waves per second

Pitch

The pitch of a sound—how high or low the sound—depends on the frequency of the sound waves. The higher the frequency, the higher the pitch; the lower the frequency, the lower the pitch



Crest- The highest part of a wave.

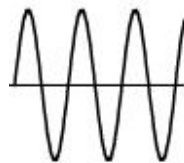
Trough - The lowest part of a wave.



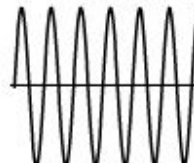
Jasper Quilton Youtube

Pitch

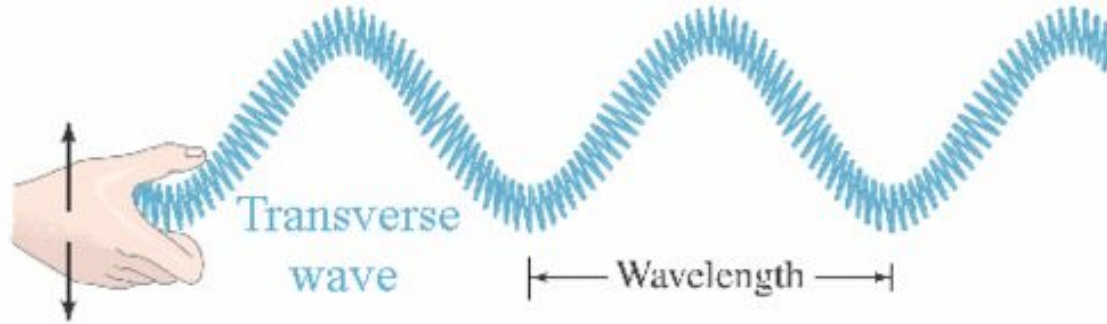
Is a measure of the speed of the vibrations. Faster vibrations create a high pitch while slower vibrations create a low pitch.



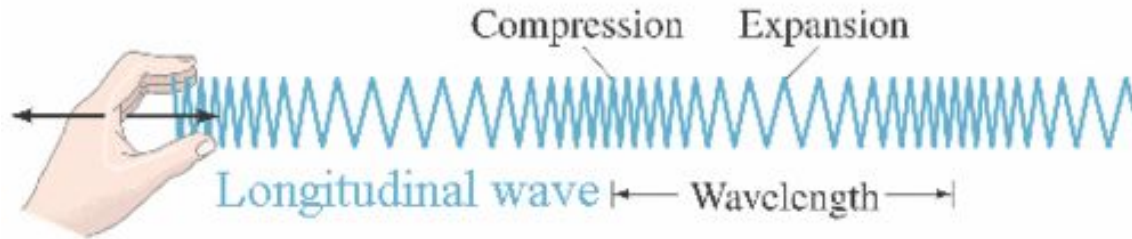
Lower
Pitch



Higher
Pitch



Transverse Wave - A wave that moves across a medium in a direction perpendicular to the direction in which the wave travels. Transverse means "across".



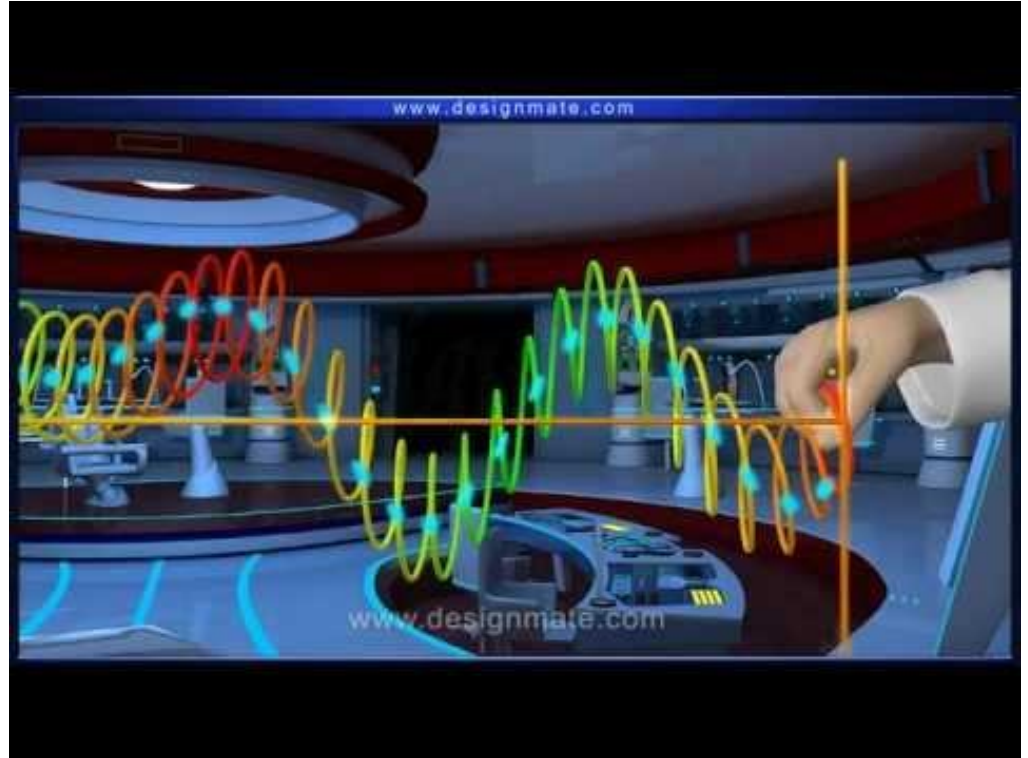
Longitudinal Wave - A wave that moves across a medium in a direction parallel to the direction in which the wave travels.

Create a transverse wave! Watch how the energy transfers.



Week #4: Sound Travels

Do you
know how
sound
travels?





The vibrations that create sound waves must travel through a “medium,” such as air or water—or anything made of molecules. To understand sound, it’s important to remember that air isn’t just empty space. Air is actually a fluid—a fluid we live in, just like fish live in water.

Creative Challenge: *Singing Glass*



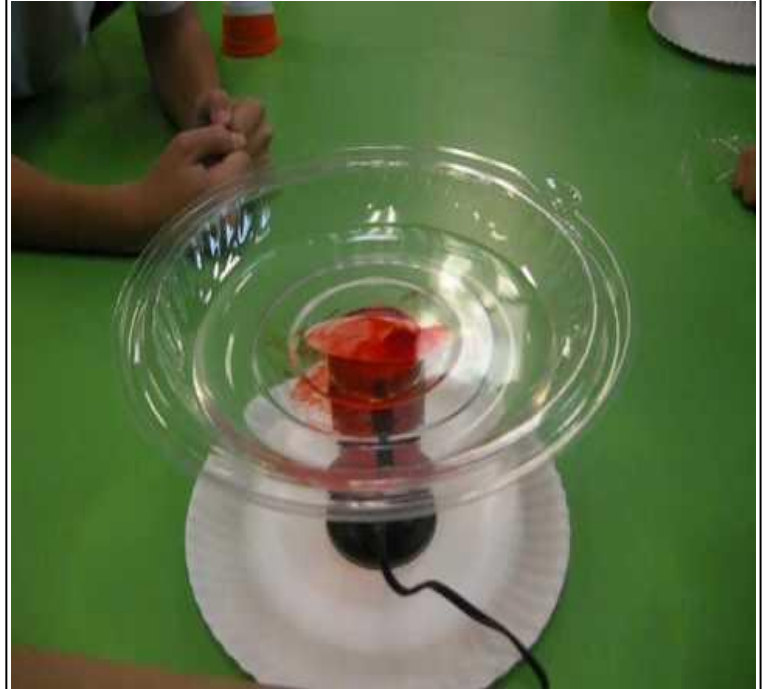
Video by reality distortion YouTube

Materials: Stemware glass, water and food coloring



Waves are a wiggle
in space cause by a
vibration or
disturbance.

Watch the video we
did!



Pro Tips by Jan Nelson

- *Read the notes in the lower bottom of frame for information on slide*
- *Gather materials for the project of the week or day before the actual project begins*
- Show video clips at the beginning of each class period
- Give youth time to finish the project. As the class continues, gradually increase the time for projects accordingly.
- Take video and photos of the youth throughout the class to add it to future presentation.

Resources:

- *(Enter resources and links here...see example below)*
- <https://online.kidsdiscover.com/unit/sound-and-vibration>
- resource for sharing <http://www.groovylabinabox.com/4-groovy-activities-to-teach-about-vibration-and-sound-energy/>
- <http://www.kidzsearch.com/wiki/Oscillation> :
- <http://study.com/academy/lesson/transverse-longitudinal-waves-definition-examples.html>
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