

W.1 I can identify that sound waves require a medium while light waves do not.

W.4 I can explain that light travels in straight lines except between the surfaces of two transparent mediums where the light bends. The ability to bend depends on the difference in frequency the wave can travel through the medium.

Sound Vs Light UnNotes

Sound is a mechanical wave. A **mechanical** wave is a wave that transfers energy through matter.

Sound - a wave that is produced by vibrating an object and travels through matter



1. The speaker **vibrates**. The surface of the speaker pushes out. This causes the particles in the air to become bunched together, or **compress**.
2. When the speaker goes back in, there is a space left open. The particles rush back in to fill up the space.
3. The back and forth movement causes the air particles to compress making a sound wave.

Sound travels in this pattern of compressions and open (low pressure) areas. Thus, sound requires **matter**!

Questions:

Corn Starch and Water Question - After watching the video, where is there evidence that the sound waves are causing compressions in the medium?

Bell in a Vacuum Demonstration

Sounds cannot travel through a vacuum because _____

Light waves are transverse waves. However, because light can travel through space, it cannot be a matter (mechanical) wave like sound waves.

Light Interaction With Matter: Flashlight and Thermometer Demonstration

	Degrees (C)
Starting Temperature	
Final Temperature	

When light is absorbed by matter, it transforms into _____ energy.

The path that light travels can be traced as straight lines except at the surfaces between different transparent materials where the light path bends.

Refraction - the bending of a light wave as it enters a new transparent medium at an angle at a different speed. Refraction occurs because **waves travel at different speeds in different mediums.**

- When light goes through two transparent objects, it bends, or refracts because light travels at different speeds in different mediums.
- The bigger the difference in the speed (frequency) that light can pass between two transparent mediums, the more bending that occurs.

Beaker and a Straw: Refraction

1. Answer the questions below to determine if refraction is occurring.

- ☐ Is there light present?
- ☐ Is there 2 transparent mediums?
- ☐ Does light pass through the mediums at different speeds?
- ☐ Is the light bending? (Does the object look distorted, broken, enlarged, shrunk, flipped upside down, etc.)

2. What were the two transparent mediums?

3. What did you see that showed you that refraction was occurring?

The Disappearing Test Tube: Is there bending light?

The test tube appeared invisible and we could see through it. If an object is transparent, that means that most of the light is doing what?

In this case, the light is transmitting, it is not refracting. Why doesn't the light refract if there are two transparent mediums (vegetable oil and glass)?