32.1 Light & Sound (Part II)

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

HoneycuttScience.com

Copyright John A. Honeycutt 2017. ©

Topic Introduction

Summarize your understanding of each paragraph.

Sound and light are similar in that both are forms of energy that travel in waves. They both have properties of wavelength, frequency and amplitude.

Sound can only travel through a medium (substance) while light can travel through empty space. Sound is a form of mechanical energy caused by vibrations of matter.

Light and sound both travel in waves, but not of the same type. Visible light is part of the electromagnetic spectrum, and can therefore travel through a vacuum. Sound propagates as a longitudinal wave, and needs a medium (such as air) to travel through.

Light travels as transverse waves and can travel through a vacuum. Sound travels as longitudinal waves and needs to travel through a solid, liquid or gas: it cannot travel through a vacuum.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

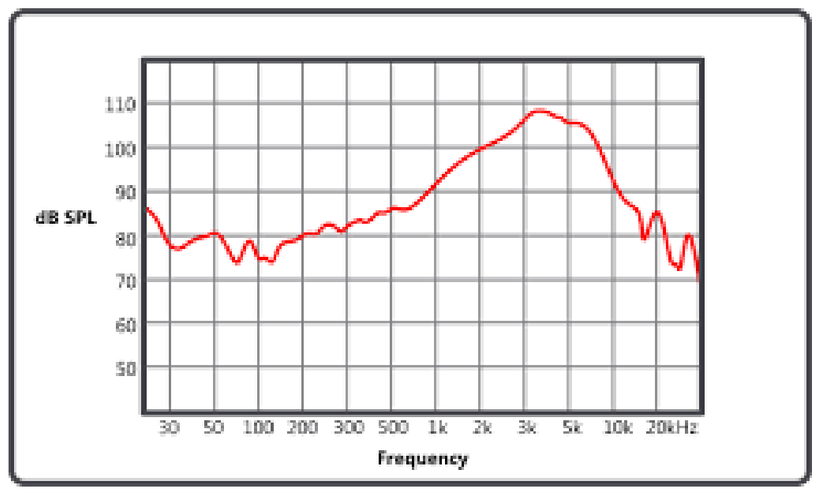
Title of Passage.

1

2

Below is an example of a frequency response graph. The graph shows how an earbud speaker responds to different sound frequencies. In this case, the word "respond" refers to the speaker's ability to reproduce audio frequencies.

Reading the chart is actually pretty simple. The chart shows the range of frequencies (from low to high) horizontally and the Sound Pressure Levels (SPL) in Decibels (dB) vertically. The frequency range represented on this graph is 20Hz to 20,000Hz (20kHz), which is the range of typical human hearing.



http://www.centerpointaudio.com

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

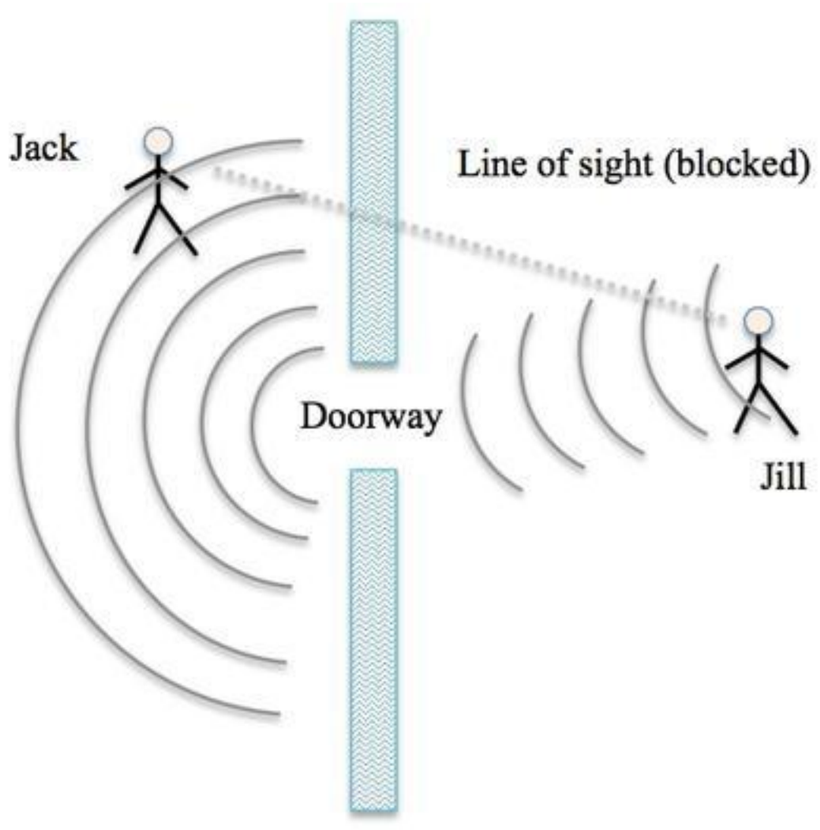
Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Diffraction is the bending of waves around obstacles, or the spreading of waves by passing them through an aperture, or opening. Any sort of energy that travels in a wave is capable of diffraction, and the diffraction of light and sound waves produces a range of effects. Sound waves are much bigger than light waves, however, so diffraction of sound is a part of everyday life that most people today take for granted. Diffraction of light waves, on the other hand, is a lot more complex, and has a range of applications in science and technology, including the use of diffraction gratings in the creation of holograms.

Imagine going into a music venue for your favorite electronic dance music (EDM) and you find yourself directly behind a building beam. You can't see the band, obviously, since the light waves in the point are obstructed. However, you have very little trouble hearing the music, because sound waves easily diffract around the pillar. Light waves diffract marginally in such a circumstance, but not enough to make a difference regarding your enjoyment of the concert. If you were to look carefully while behind the beam, you would observe the diffraction of the light waves glowing slightly as they wrap round the post.

Suppose, now, that you had neglected to get a ticket to the music festival, but a friend who worked in the concert venue organized to allow you to stand outside an open door and listen to the band. The audio quality could be far from ideal, of course, but you would still have the ability to hear the music well enough. And if you stood right in front of the door, you would have the ability to see light from inside the concert hall. But, in the event that you moved away from the door and stood with your back to the building, you'd see little light, whereas the noise would still be readily perceptible.

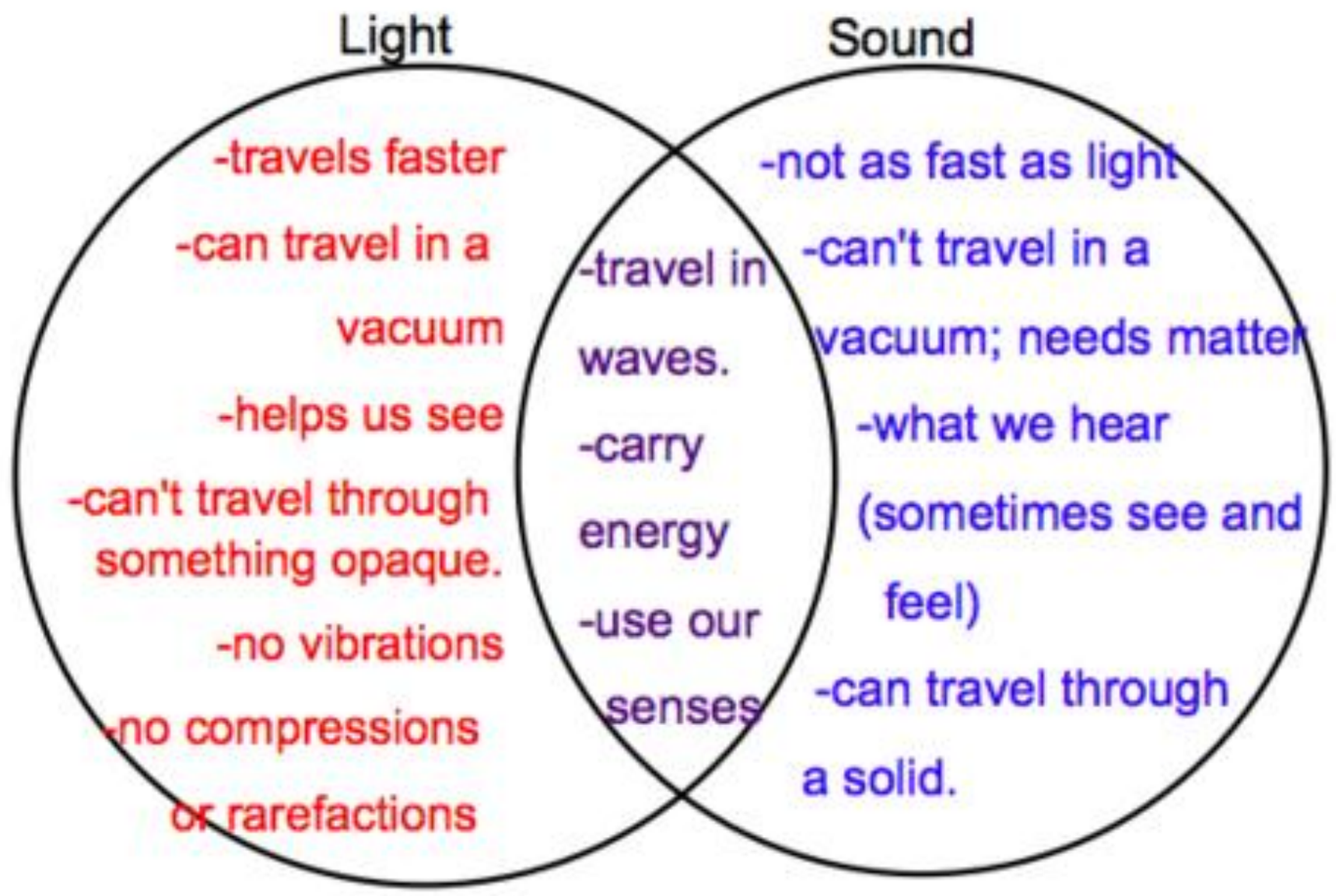


The waves where sound is transmitted are bigger, or equal in size to, the column or the door or other opening or aperture and, hence, they pass easily through such openings or around barriers. Light waves, on the other hand, have a wavelength, typically measured in nanometers (nm), which are equivalent to one-millionth of a millimeter. Wavelengths for visible light range from 400 (violet) to 700 nm (red) - this makes it possible to fit about 5,000 of even the maximum visible-light wavelengths on the head of a pin!

https://fuzeplay.io/blogs/full-steam-ahead/what-is-light-diffraction

Draw Illustration

Copy and Label the Illustration in the Space Provided



https://fuzeplay.io/blogs/full-steam-ahead/what-is-light-diffraction

Draw (Copy) the Illustration Here

Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

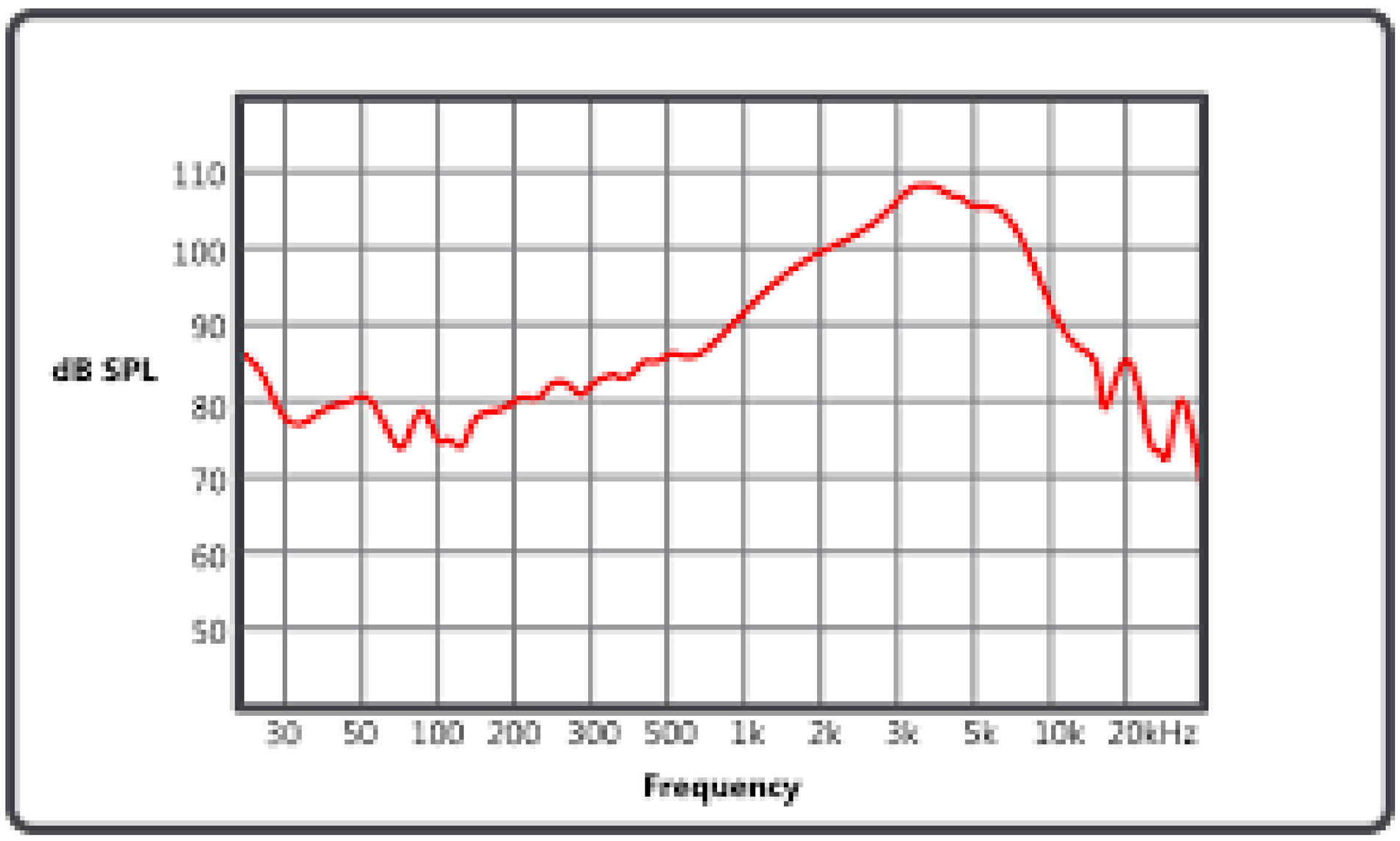
What does the Y-axis imply _____

Summarize what this graph represents or conveys

_____

http://www.centerpointaudio.com

How to Understand Frequency Response Graphs



Sound is measured in terms of frequency. The loudness is measured in decibels based on pressure levels of the sound.

Show-Off Your Smarts!

Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

Q1. How can this information be applied to a young-person's life?

Q2. How does this information apply to (or impact) communities?

Q3. When do scientists need to apply this information? How?

Q4. How would a person from 100 years ago view this information?

Q5. How does this topic connect to other science topics or math?

Write down at least three words introduced or covered by this topic.

1.
2.
3.
4.
5.
6.

Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.