

Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

Objective(s):

- *Understand how sound waves behave when they are either reflected or diffracted by a physical boundary.*
- *Understand how sound waves experience constructive and destructive interference and how these apply to the creation of beats.*

Notes:

During the video segment, use words, phrases, or drawings to take notes.

Summary:

After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"

Answer the following.

1. Define diffraction in your own words.

Diffraction occurs when waves bend around an object.

2. What types of sound waves diffract more than others?

Sound waves with low frequencies and long wavelengths diffract

more than sound waves with high frequencies and short wavelengths.

3. When you hear thunder from far away, does it have a high pitch or a low pitch? Explain.

Thunder from far away has long wavelengths and a low pitch because any sound waves that are created with short wavelengths and a high pitch are absorbed before they reach the observer.

4. Define reflection in your own words.

Reflection occurs when waves bounce off an object.

5. Describe what happens to the amplitude of sound waves that experience constructive interference.

When sound waves experience constructive interference, the resulting amplitude is greater than the combined amplitudes of the affected waves. The sound is therefore louder.

6. Describe what happens to the amplitude of sound waves that experience destructive interference.

When sound waves experience destructive interference, the resulting amplitude is less than the combined amplitudes of the affected waves. The sound is therefore quieter or non-existent.

7. Define the superposition principle in your own words.

The superposition principle is when two waves at the same time and in the same place combine to create a new wave.

Answer the following.

8. When are beats formed?

Beats are formed when two sound waves with frequencies similar in magnitude interfere with each other. A pattern of alternating constructive and destructive interference occurs, creating areas of rhythmic, higher amplitudes and a resulting sound that is alternately louder and softer.

9. How do you determine the beat frequency between two different waves?

The beat frequency is equal to the difference in frequency between the two waves.