

## Week 26 - Sound

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### Read Page 306 (Sound Waves)

TQ1. How does sound actually travel through the air?

TQ2. What is the speed of sound at standard temperature and pressure (STP)?

QQ3. A boy yells into a canyon and hears his echo almost exactly 6 seconds later at STP. How deep is the canyon (hint: keep in mind the echo had to travel to the bottom of the canyon and back)?

QQ4. There is a G note on a piano that has a frequency of 784 Hz. If played at STP, what is the wavelength of that G note?

TQ5. If one certain frequency is played and it causes another object to vibrate, the object is said to have the same what?

TQ6. What is the phenomenon called where one frequency causes another object to vibrate? An example is an opera singer breaking glass with her voice?

CQ7. When air is blown across the top of an open water bottle, air molecules in the bottle vibrate at a particular frequency and sound is produced.

### Read Page 309 (Interference)

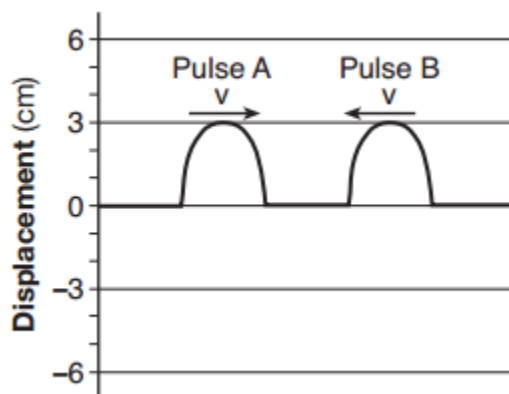
TQ8. If you have three dollars and your friend has 4 dollars, and you pull your money together, you will have 7 dollars. This is a model for what principle?

CQ9. According to the principle modeled in TQ36, what would be the result of a wave with a magnitude of +5 and a wave with a magnitude of -3 when they interact together?

TQ10. What type of interference is TQ36 a model for?

TQ11. What type of interference is CQ37 an example of?

QQ12. When the two pulses below (Pulse A and Pulse B) are superposed, what will be the result?



CQ13. Two waves, one of 5 cm and one of 10 cm, are moving towards each other as shown below. Sketch and indicate the size of these waves when (a) they superpose on each other and (b) when they have passed through each other.

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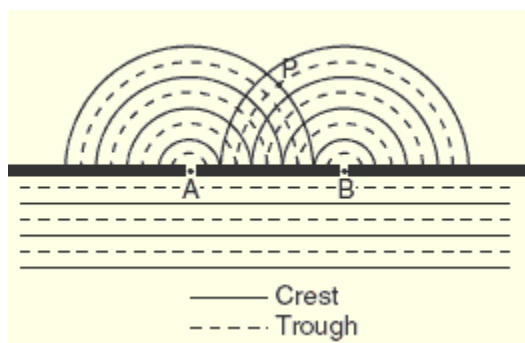


**Initial**

**Superpose**

**Pass Through**

CQ14. The diagram below shows wavelengths of water waves passing through openings A and B in a barrier. Is Point P constructive or destructive interference and what happens to the amplitude of the wave?

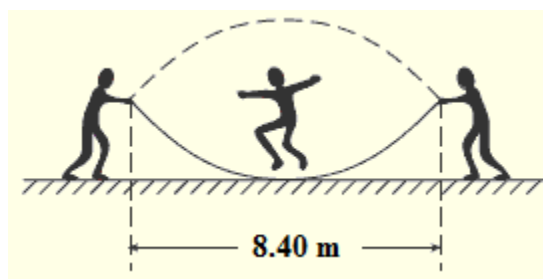


**Read Page 312 (Standing Waves)**

CQ15. The diagram below represents a standing wave. How many nodes are present and how many antinodes are present?



CQ16. What is the wavelength of the standing wave in the rope shown below?



QQ17. If the students above are making the wave shown in the picture at a frequency of 0.25 cycles per second, what is the speed of the wave pattern?

**Read Page 315 (Doppler Effect)**

TQ18. During the Doppler Effect, what property of the wave will change if there is motion in either the observer or the source of the sound?

TQ19. If the source and/or the observer move toward each other, what happens?

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CQ20. An ambulance siren is playing a tone of a frequency 400 Hz. If the ambulance is moving toward you what could the frequency be of the tone?

CQ21. As Ms. Sheila is yelling at a student, the student moves away in fear for their life. What happens to the frequency and what happens to the amplitude of the sound?

TQ22. What scientific evidence proves that the universe is expanding?