

Essential Physics Reading Guide – Ch 15

Sound

Complete the following Reading Guide as you explore the chapter. This guide is to help you gather information on the chapter. Use complete sentences for your answers. While information is the key, your communication skills are of equal importance.

I. Read the Chapter Summary First! (Page - 423).

II. Reading guide questions:

1. What is a Sound Wave?
2. How exactly is sound transmitted through the air?
3. What is the velocity of sound at room temperature?
4. How does the velocity of sound change with temperature?
5. How does the velocity of sound in a gas compare to either a solid or a liquid?
6. State the equation used to determine the velocity of a wave.
7. How do bats determine distance?
8. What characteristics do sound waves share with other types of waves?

7. List of the seven parts of the human ear.

a.

b.

c.

d.

e.

f.

g.

8. What is the pitch of a sound?

9. What two scientist, first determine the relationship between pitch and frequency?

10. What characteristic of a wave is related to the loudness of a sound?

11. What familiar sounds are related to the following decibel readings?

10 dB =

30 dB =

50 dB =

70 dB =

80 dB =

100 dB =

110 dB =

140 dB

12. What is the predictable result of listening to music through headphones or ear buds at excessive sound levels?

13. What is the Doppler Effect?

14. What is the equation for the Doppler Effect?

15. Read the Connecting Math to Physics feature below to see how the Doppler Effect equation reduces when the source or the observer is stationary. Now, quickly forget it.

16. How do the following items make use of the Doppler effect?
 - Radar –

 - Astronomers –

 - Physicians –

 - Bats –

 - The doors at Orchard Market –

17. Who was the first scientist to study some production and musical instruments? When did he perform his experiment?

18. What is the sound source of the following instruments?
 - Human voice =

 - Brass instruments=

 - Reed instruments =

 - Flutes =

 - Stringed instruments =

 - Electric guitars =

19. What is resonance?

20. What is a closed pipe resonator?

21. What is an open pipe resonator?
22. How does resonance occur?
23. At what wavelength ratios will resonance occur in a closed resonator?
24. At what wavelength ratios will resonance occur in an open resonator?
25. What controls the speed of a wave on a string?
26. In musical terms, what three terms refer to the difference between two musical instrument waves?
27. In musical instruments, what is a fundamental?
28. What are harmonics?
29. Compare and contrast the musical terms, Dissonance and Consonance:
Dissonance:
Consonance:
30. What determines a musical interval?
31. Many musical instruments are tuned using beats. What are beats?
32. What is the frequency range of human hearing?