

## Waves, Light, & Sound Test

1. The chart shows the speed of sound through various materials.

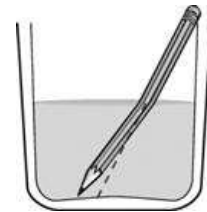
Material	Speed of Sound (m/s)
Air (20°C)	344
Seawater	1531
Brick	4176
Steel	6000

Which best describes the relationship between the material and the speed of sound as shown in this chart?

- A. the denser the material, the faster the speed of sound
- B. the denser the material, the slower the speed of sound
- C. the more opaque the material, the slower the speed of sound
- D. the more transparent the material, the faster the speed of sound
2. A substance that transfers sound waves is called?
- A. a fulcrum.      B. a medium.      C. a spectrum.      D. An equilibrium.
3. Which of the following is the unit used to measure the frequency of a wave?
- A. Decibel      B. Meters      C. Hertz      D. m/sec
4. What type of lens is part of the human eye?
- A. concave lens      B. concave mirror      C. convex lens      D. convex mirror

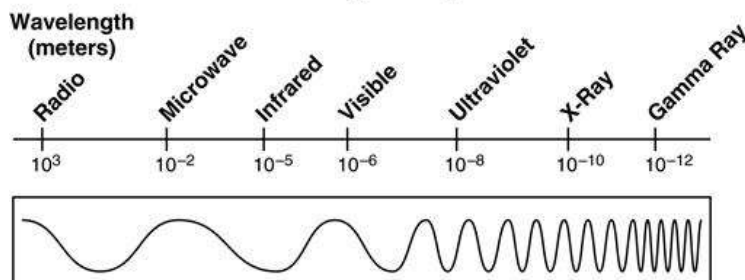
5. When a pencil is placed in a cup of water, the pencil looks bent.

What does this demonstration show?



- A. reflection      B. refraction      C. interference      D. diffraction

6. The Electromagnetic Spectrum



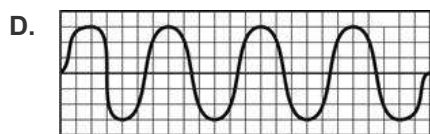
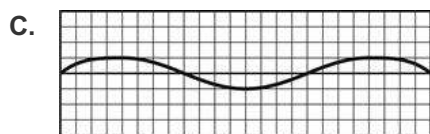
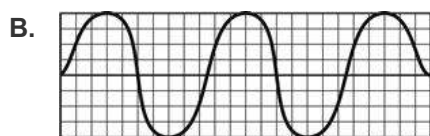
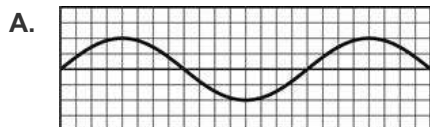
Which of these types of electromagnetic radiation has the lowest frequency?

- A. Visible Light      B. X-Ray      C. Gamma Ray      D. Radio Wave

7. Which of the following are the primary colors of light?

- A. red, blue, green
- B. red, blue, yellow
- C. yellow, red, orange
- D. cyan, magenta, blue

8. The volume of a sound depends on the amplitude of the sound waves. The lower the amplitude of a sound wave, the quieter the sound. Which of the following sound waves illustrates the quietest sound?



9. What wave behavior causes a sound to travel from the hallway into the classroom?

- A. reflection
- B. refraction
- C. interference
- D. diffraction

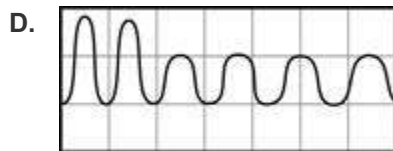
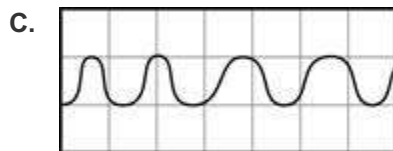
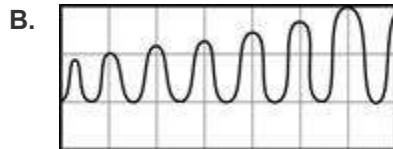
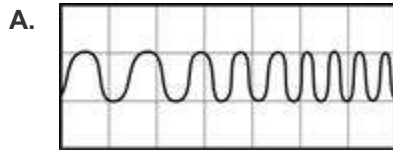
10. Which type of wave requires a medium?

- A. mechanical wave
- B. transverse wave
- C. infrared wave
- D. light wave

11. Which statement **best** explains why the human eye perceives blue light?

- A. The object reflects blue light.
- B. Blue light travels faster than red light.
- C. Blue light waves are absorbed by the object.
- D. Blue light waves have a lower frequency than the other colors.

12. During a 4th of July celebration, scientists were measuring sound waves as the fireworks exploded. Which illustration indicates that the fireworks were becoming louder?

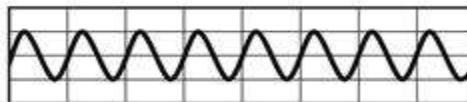


13. The charts below show sound waves from a musical instrument.

**Chart 1**



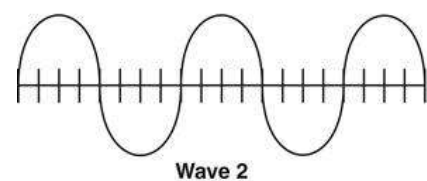
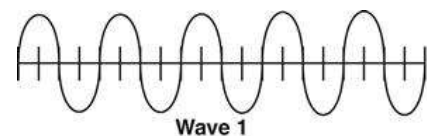
**Chart 2**



In which way is the sound wave in Chart 1 different from the sound wave in Chart 2?

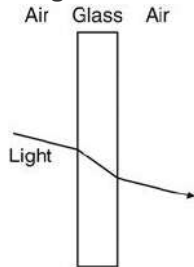
- A. it has a higher pitch
  - B. it has a lower volume
  - C. it has a greater amplitude
  - D. it has a lower frequency
14. What do waves transfer?
- A. energy.
  - B. heat
  - C. motion
  - D. matter
15. Sound waves travel fastest in
- A. air.
  - B. iron.
  - C. water.
  - D. a vacuum
16. Manny compared the properties of two waves traveling through the same medium.

How do Wave 1 and Wave 2 differ from each other?



- A. Wave 1 has a lower frequency than Wave 2.
- B. Wave 1 has a greater amplitude than Wave 2.
- C. The speed of Wave 1 is greater than that of Wave 2.
- D. The wavelength of Wave 1 is less than that of Wave 2.

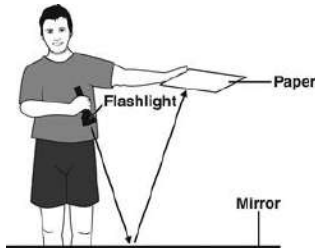
17. A light wave travels through the air, passes through glass, and then travels back into the air.



Which best describes what is happening to the light when it passes from the air and travels through the glass?

- A. The light wave is diffused.
- B. The light wave is reflected.
- C. The light wave is refracted.
- D. The light wave is diffracted.

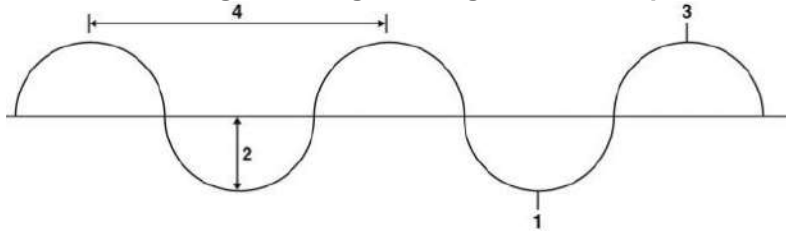
18. Frank shined a beam of light at the surface of a mirror. A piece of paper above the mirror was lit up.



What caused the light to shine on the paper above the mirror?

- A. The light was refracted.
- B. The light was reflected.
- C. The light was amplified.
- D. The light was diffracted.

19. Maria was making a drawing showing the different parts of a wave.



Which number should she label as the amplitude of the wave?

- A. 1      B. 2      C. 3      D. 4
20. Some students were on a tour exploring the inside of a cave. While the students were in the cave, they realized they heard an echo every time that they spoke. Which most likely caused the echo to occur?
- A. the accumulation of the sound waves  
B. the diffraction of the sound waves  
C. the refraction of the sound waves  
D. the reflection of the sound waves
21. Visible light is which type of wave?
- A. seismic      B. mechanical      C. longitudinal      D. electromagnetic
22. A longitudinal wave, such as a sound wave, can travel through
- A. solids only.  
B. liquids only.  
C. gas, liquids, and solids.  
D. gas and a vacuum only.
23. Sound travels as a
- A. wave without a medium.  
B. series of compressions only.  
C. pattern of up and down vibrations.  
D. pattern of compressions and rarefactions.
24. All of these types of waves travel from the Sun to Earth except
- A. light waves.      B. sound waves.      C. infrared waves.      D. ultraviolet waves.
25. The visible colors listed from shortest to longest wavelength are violet, blue, green, yellow, orange, and red. Which of the following accurately compares the frequency of these colors using this information?
- A. Blue has a higher frequency than violet.  
B. Blue has a higher frequency than green.  
C. Orange has a lower frequency than red.  
D. Violet has a lower frequency than yellow.

26. **The loudness of sound can be changed by**
- A. decreasing the pitch.
  - B. increasing the frequency.
  - C. increasing the amplitude.
  - D. decreasing the wavelength.
27. **Which color of light is produced when all of the colors of visible light in the electromagnetic spectrum are combined?**
- A. gray      B. white      C. black      D. brown
28. **During a sporting event, a referee uses a whistle to alert the teams to start and stop playing. What causes the sound from the referee's whistle to travel in all directions?**
- A. vibrations on the ground
  - B. vibrations of the air
  - C. seismic waves
  - D. light waves
29. **Which object is best used to demonstrate the bending of light as it passes through a substance?**
- A. convex lens      B. flat mirror      C. opaque rod      D. concave mirror
30. Which of the following is the **highest** point of a transverse wave?
- A. trough      B. crest      C. amplitude      D. wavelength
31. Which of the following is the **lowest** point of a transverse wave?
- A. trough      B. crest      C. amplitude      D. wavelength
32. Which of the following wave behaviors allows you to see all of the colors in the visible light spectrum all at once?
- A. reflection      B. absorption      C. diffraction      D. Both A and B are correct
33. **The driver of a car at a railroad crossing hears a change in pitch of the train whistle as the train passes by. This change in pitch is most likely due to**
- A. the Doppler effect.
  - B. the Compton effect.
  - C. a change in medium.
  - D. a change in speed.