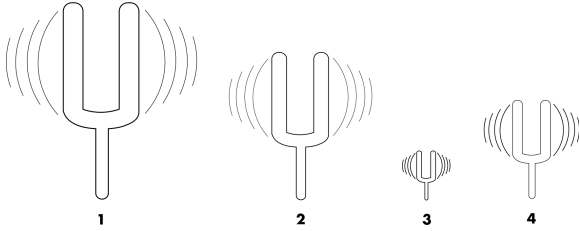




7. When a tuning fork vibrates, it produces a sound. The shortest tuning fork vibrates the fastest. Arrange these tuning forks from low pitch to high pitch.

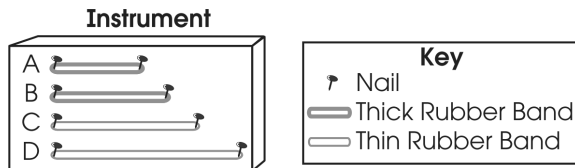


- A. 1, 2, 4, 3    B. 2, 1, 4, 3    C. 1, 2, 3, 4    D. 3, 2, 4, 1

8. During a space walk, an astronaut lets go of a tool, causing it to float away and bounce off the side of the space shuttle. Why does the astronaut see the tool hit the shuttle but not hear it?

- A. Light waves cannot travel through a vacuum. However, sound waves can.  
 B. Sound waves cannot travel through a vacuum. However, light waves can.  
 C. Neither sound nor light waves can travel through a vacuum.  
 D. Both sound and light waves can travel through a vacuum.

9. Students pluck each rubber band on the instrument shown below.



Which rubber band produces a sound with the highest pitch?

- A. rubber band A                      B. rubber band B  
 C. rubber band C                      D. rubber band D

10. If the source of a sound is moving away from you, what characteristic of the sound waves reaching your ears decreases?

- A. quality                                  B. velocity  
 C. frequency                              D. wavelength

11. How are earthquakes, sound, and light waves alike?

- A. They transmit energy.              B. They carry matter.  
 C. They travel in space.                D. They can be seen.

12. Ultrasound devices use sound waves to create images that allow doctors to see inside the human body. Which *best* describes how sound waves are able to help create these images?

- A. Sound waves can be absorbed.  
 B. Sound waves reflect off objects.  
 C. Sound waves measure different temperatures.  
 D. Sound waves change speed in different materials.

13. Why is lightning seen before thunder is heard?

- A. Light travels slower than sound.  
 B. Light travels faster than sound.  
 C. Lightning has more energy than thunder.  
 D. Lightning has less energy than thunder.

14. Which of the following is a similarity between x-ray waves and sound waves?

- A. Both transfer energy.  
 B. Both travel through a vacuum.  
 C. Both have the same speed.  
 D. Both have the same frequency.

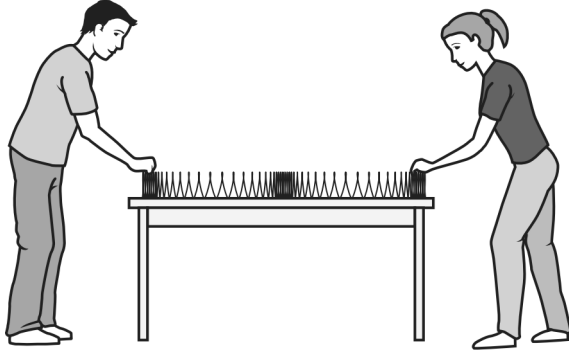
15. Which observation demonstrates that light waves travel much faster than sound waves?

- A. An exploding firework is seen before it is heard.  
 B. Light from the Sun takes eight minutes to reach Earth.  
 C. Thunder can be heard before lightning is seen.  
 D. A returning echo is heard after a split-second delay.

16. Which of the following observed properties of a wave is changed by the Doppler effect?

- A. amplitude    B. direction    C. frequency    D. speed

17. The diagram below shows two students making a wave with a coiled spring.



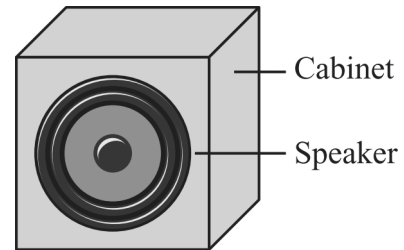
Which of the following waves move most like the wave in the coiled spring?

- A. infrared waves                      B. microwaves  
C. sound waves                          D. ultraviolet waves
18. Sound travels through air, steel, and water at different speeds. Which list is ordered from the substance that sound will travel through the slowest to the substance that sound will travel through the fastest?
- A. air, water, steel                      B. steel, air, water  
C. water, air, steel                      D. water, steel, air

19. A car with its horn sounding approaches a group of students. Assume the car's horn produces sound waves with a constant frequency.

Which of the following statements *best* explains why the students hear a higher pitch as the car approaches than when it is stopped?

- A. The sound waves increase in speed as the car approaches the students.  
B. The sound waves decrease in speed as the car approaches the students.  
C. The sound waves are heard at a lower frequency as the car approaches the students.  
D. The sound waves are heard at a higher frequency as the car approaches the students.
20. The picture below shows a sound speaker in a cabinet with its front panel removed.



When music plays through the speaker, the speaker rapidly moves back and forth in the cabinet. Which of the following conclusions is *best* supported by this observation?

- A. Sound travels only in air.  
B. Sound is a transverse wave.  
C. Sound is a longitudinal wave.  
D. Sound travels at the speed of light.