Name:

1. Use your understanding of the transmission of sound and the table to answer the following question.

Speed of Sound in Substances (all substances at 25°C)

Substance	Speed (m/s)
air	346
water	1498
seawater	1531
silver	2680
aluminum	5000

One could conclude that sound is transmitted fastest in

A.	solids.	В.	liquids.
C.	gases.	D.	a vacuum.

2. Engineers are designing an auditorium that will be used for performances by orchestras.

What must they do to maximize the loudness of the sound heard by the audience?

- A. hang curtains behind the orchestra
- B. put carpet all around the walls of the auditorium
- C. hang reflecting panels from the ceiling behind the orchestra
- D. install narrow glass windows and skylights around the top of the walls
- 3. Architects are working with engineers to build a lecture hall. How can they design it so that echoes are reduced and speech is *not* heard as garbled sounds?
 - A. build smooth marble walls, ceilings and polished floors
 - B. construct many flat walls, angled ceilings and smooth floors
 - C. use an ultramodern design of metal walls, pillars and seats
 - D. build walls out of porous materials, upholster the seats and add carpets

Date:

4. Use the table to answer the following question.

Speed of Sound			
Substance	Temperature (°C)	Speed (m/s)	
	0	331	
dry air	25	346	
	100	366	

Could the speed of sound be used to estimate dry air temperature, based on the data above?

- A. No, because the speed of sound in dry air is the same regardless of temperature.
- B. No, because as temperature increases, the speed of sound in dry air increases.
- C. Yes, because as temperature increases, the speed of sound in dry air increases.
- D. Yes, because as temperature decreases, the speed of sound in dry air increases.
- 5. Which *best* explains the relationship between the speed of sound and the medium through which it passes?
 - A. Sound travels faster in solids because of the increased distance between solid particles.
 - B. Sound travels faster in air because of the decreased distance between air particles.
 - C. Sound travels slower in air because of the increased distance between air particles.
 - D. Sound travels slower in solids because of the decreased distance between solid particles.
- 6. An object produces a sound of constant frequency. If the object moves toward a student who is standing still, what happens to the pitch and the wavelength of the sound the student hears while the object is getting closer?
 - A. pitch increases, and wavelength decreases
 - B. pitch increases, and wavelength increases
 - C. pitch decreases, and wavelength increases
 - D. pitch decreases, and wavelength decreases

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.

Instrument



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	В.	velocity
11.	quanty	Б.	verocity

- C. frequency D. wavelength
- 11. How are earthquakes, sound, and light waves alike?

A.	They transmit energy.	В.	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

Sound Quiz (6.P.1.3)

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.