

# Review for the Waves and Sound Test

p. 1 due Tues. 2/18 all due Fri. 2/21 –same day as TEST

1. Explain the difference between frequency and period. What units are they in?

10 waves pass a given point every second. The frequency of this wave is \_\_\_\_\_.

10 waves pass a given point every second. The period of this wave is \_\_\_\_\_.

2. Explain how a sound wave travels and sketch one making sure to label its parts (*compression, rarefaction and wavelength*). Sound is a \_\_\_\_\_ wave.

3.

a. As a sound moves toward you, the apparent frequency of it \_\_\_\_\_.

b. As a sound moves away from you, the apparent frequency of it \_\_\_\_\_.

c. This is known as the \_\_\_\_\_.

4. Humans can hear up to approximately \_\_\_\_\_ Hz.

5. Which travels faster, light or sound? Provide 1 example that shows this to be true.

6. If the temperature of the air decreases by 15 °C, how much does the speed of sound decrease by?

7. A sound wave of frequency 420 Hz is heard 1 mile away 4.2 seconds after the sound is made. What is the wavelength of the sound wave? **(ans. 0.91 m)**

8. Convert 346 Hz into kHz. \_\_\_\_\_ 45,900 MHz = \_\_\_\_\_ Hz

9. Calculate the wavelength of 105.1 FM in meters. **(2.85 m)**

10. Calculate the wavelength of AM 1130 in meters. **(265.5 m)**

Name \_\_\_\_\_ Hour \_\_\_\_\_

11. A car honking its horn is moving away from a stationary observer at 14 m/s. If the frequency of the horn is 250 Hz, what frequency would the observer hear if it is 12° C outside? **(ans. 240 Hz)**

What frequency would the observer hear if the car was moving towards her? **(ans. 261 Hz)**

12. If the speed of sound outside this morning was 313 m/s, what is the temperature in °F? **(-19 F)**

13. A child drops a rock off a cliff that is 45 m high. If the temperature is 25 °C, how soon after dropping the rock will she hear the sound of the rock hitting the ground? (Be careful...think this one through!) **(3.16 sec)**

14. If you hear a firecracker 0.25 sec after seeing it and it is 85 °F outside, how far away from the fireworks are you? **(86.9 m)**

15. A tuning fork ( $f = 400$  Hz) resonates with an air column closed at one end. What is the shortest length of air column that will resonate with this tuning fork in centimeters if the speed of sound that day is 340 m/s? **(ans. 21.3 cm)**

16. Explain 2 things that the speed of sound depends on and why.

Name \_\_\_\_\_ Hour \_\_\_\_\_

17. Sketch a standing wave. Define and label its parts. (node, antinode)
  
18. Explain why a baseball bat, tennis racket or a golf club has a sweet spot.
  
19. Explain what supersonic is and what noise is produced when things are supersonic.
  
20. What does "Mach 2" mean? Approximately how many miles per hour is that?
  
21. Describe what resonance is, and give 1 example where it occurs.
  
22. The speed of sound is a constant (at a constant temp). If you change the wavelength of the wave, what will happen to the frequency?
  
23. The boomwhackers have all different lengths. Should a shorter one have a higher or lower pitch? Explain using the ideas from #22.
  
24. What is fundamental frequency?
  
25. What is the fundamental frequency of an organ pipe that is 0.4 meters long and is closed at one end if the speed of sound is 350 m/s? **(ans. 219 Hz)**
  
26. If a pipe has a fundamental frequency of 250 Hz, find the next two harmonics if the pipe is  
**OPEN:** **CLOSED:**
  
27. You spin a flexible plastic pipe that is open at both ends around your head that has a length of 0.9 meters. If it is 70 °F in the room, find the first three harmonics. **(ans. 190 Hz, 380 Hz, 570 Hz)**