# Speed of Waves Quiz Answer Key PDF

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**What is the unit of measurement for wave speed?**

A. Hertz (Hz)

**B. Meters per second (m/s) ✓**

C. Joules (J)

D. Newtons (N)

**Which of the following waves does not require a medium to travel?**

A. Sound waves

B. Water waves

**C. Light waves ✓**

D. Seismic waves

**What are the effects of increasing the temperature on the speed of sound in air? (Select all that apply)**

**A. Increases speed ✓**

B. Decreases speed

C. No effect

D. Changes frequency

**How does the elasticity of a medium affect the speed of mechanical waves?**

**The elasticity of a medium affects the speed of mechanical waves by allowing the medium to return to its original shape more quickly after being disturbed, which increases the wave speed.**

**Why do electromagnetic waves not require a medium to travel?**

**Electromagnetic waves do not require a medium because they are composed of oscillating electric and magnetic fields that can propagate through the vacuum of space.**

**Discuss the impact of medium density on the speed of waves, providing examples.**

**Medium density generally slows down wave speed because denser materials have more mass for the wave to move, which can impede its progress. For example, sound travels slower in air than in water or steel.**

**How does Snell's Law relate to the change in wave speed across different mediums?**

**Snell's Law describes how the angle of incidence and refraction change when a wave passes from one medium to another, which is due to the change in wave speed. This change in speed results in the bending of the wave path.**

**Explain how the speed of sound changes when it travels from air into water.**

**The speed of sound increases when it travels from air into water because water is denser and more elastic than air, allowing sound waves to propagate faster.**

**What is the speed of sound in air at 20°C?**

A. 150 m/s
B. 299 m/s
**C. 343 m/s ✓**
D. 400 m/s

**Which of the following factors affect the speed of mechanical waves? (Select all that apply)**

**A. Medium density ✓**
**B. Medium elasticity ✓**
C. Frequency
**D. Temperature ✓**

**Which types of waves are considered mechanical waves? (Select all that apply)**

**A. Sound waves ✓**

B. Light waves
**C. Water waves ✓**
D. Radio waves

**Which of the following are true about electromagnetic waves? (Select all that apply)**

A. They require a medium to travel
**B. They travel at the speed of light in a vacuum ✓**
**C. They include radio waves ✓**
D. They are affected by medium density

**Describe the relationship between wave speed, frequency, and wavelength using the wave equation.**

**The wave equation v = f × λ shows that wave speed (v) is the product of frequency (f) and wavelength (λ). This means that for a constant speed, an increase in frequency results in a decrease in wavelength and vice versa.**

**In which medium do sound waves travel the fastest?**

A. Air
B. Water
**C. Steel ✓**
D. Vacuum

**What is the approximate speed of light in a vacuum?**

A. 150,000,000 m/s
**B. 299,792,458 m/s ✓**
C. 343 m/s
D. 1,000,000 m/s

**What happens to the speed of sound in air as the temperature increases?**

A. It decreases
B. It remains constant
**C. It increases ✓**

D. It fluctuates randomly

**Which property of a medium generally causes waves to travel slower?**

A. High elasticity
B. Low density
**C. High density ✓**
D. Low temperature

**Which equation represents the relationship between wave speed, frequency, and wavelength?**

A. $v = f + \lambda$
**B. $v = f \times \lambda$ ✓**
C. $v = f / \lambda$
D. $v = \lambda / f$

**What changes when a wave enters a different medium? (Select all that apply)**

**A. Speed ✓**
B. Frequency
**C. Wavelength ✓**
D. Amplitude

**Which of the following statements about wave speed are correct? (Select all that apply)**

**A. It is constant for a given medium ✓**
B. It changes with frequency
**C. It is the product of frequency and wavelength ✓**
**D. It can be affected by medium properties ✓**