Wave Properties Quiz Answer Key PDF

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Explain how waves transfer energy without transferring matter.

Waves transfer energy without transferring matter by causing particles in a medium to oscillate around their equilibrium positions, allowing energy to move through the medium while the particles themselves do not travel with the wave.

How does changing the amplitude of a wave affect its energy?

The energy of a wave is proportional to the square of its amplitude; thus, if the amplitude increases, the energy increases.

Which of the following is a mechanical wave?

A. Light wave
B. Radio wave
C. Sound wave ✓
D. X-ray

Discuss how refraction occurs and provide a real-world example.

Refraction occurs when light travels from one medium to another, such as from air to water, causing it to change speed and direction. A real-world example is when a straw in a glass of water looks bent at the surface due to this bending of light.

Describe the difference between transverse and longitudinal waves, providing an example of each.

Transverse waves move in a direction perpendicular to the wave's propagation, such as light waves, while longitudinal waves move in the same direction as the wave's propagation, such as sound waves.

What is the unit of frequency?

A. Meters
B. Seconds
C. Hertz ✓
D. Joules

The energy of a wave is proportional to which of the following?

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

Phase is measured in which units?

A. Meters
B. Seconds
C. Degrees or radians ✓
D. Hertz

What is the formula for wave speed?

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

Why is amplitude squared used to describe the energy of a wave?

Amplitude squared is used to describe the energy of a wave because energy is proportional to the square of the amplitude, reflecting the relationship between displacement and energy in wave mechanics.

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

A. Sound waves

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

Which of the following describe a transverse wave? (Select all that apply)

A. Particles move parallel to wave direction
B. Particles move perpendicular to wave direction ✓
C. Light waves are an example ✓
D. Sound waves are an example

Which property of sound waves determines the pitch?

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

How do sound waves differ from light waves in terms of their propagation and medium requirements?

Sound waves differ from light waves in that sound requires a medium to travel through, whereas light can propagate through a vacuum.

What factors affect the energy carried by a wave? (Select all that apply)

A. Amplitude ✓
B. Wavelength
C. Frequency ✓
D. Phase

What happens to a wave during reflection?

A. It speeds up
B. It bends
C. It bounces back ✓

D. It stops

Which of the following are examples of mechanical waves? (Select all that apply)

A. Sound waves ✓
B. Water waves ✓
C. Light waves
D. Seismic waves ✓

What is a wave?

A. A transfer of matter
B. A disturbance that transfers energy ✓
C. A stationary phenomenon
D. A solid object

Which phenomena involve the bending of waves? (Select all that apply)

A. Reflection
B. Refraction ✓
C. Diffraction ✓
D. Interference

Which of the following are true about wave speed? (Select all that apply)

A. It is constant for all waves in a vacuum
B. It depends on the medium for mechanical waves ✓
C. It is calculated as v = f λ ✓
D. It is independent of frequency