



Note-taking Worksheet

Waves

Section 1 The Nature of Waves

- A. **Wave**—a repeating disturbance or movement that transfers _____ through matter or space
1. Molecules pass energy on to _____ molecules.
 2. Waves carry energy without transporting _____.
 3. All waves are produced by something that _____.
 4. **Medium**—a _____ through which a wave travels.
 - a. May be solid, liquid, or _____
 - b. Not all waves need a medium to travel through; example: _____
- B. **Mechanical waves**—waves that can travel only through _____
1. **Transverse waves**—matter in the medium moves back and forth _____ the direction that the wave travels; example: _____
 2. **Compressional waves**—matter in the medium moves _____ that the wave travels; example: _____
 3. **Combinations**—not purely transverse or compressional; examples: water waves, _____ waves

Section 2 Wave Properties

- A. Ways waves differ
1. How much _____ they carry
 2. How _____ they travel
 3. How they look
 - a. _____ waves have **crests**—the highest points, and **troughs**—the lowest points.
 - b. Compressional waves have dense regions called _____ and less dense regions called _____.
- B. **Wavelength**—the distance between one point in the wave and _____

Note-taking Worksheet (continued)

C. **Frequency**—how many _____ pass a fixed point each second

- Expressed in _____
- As frequency increases, wavelength _____.
- The frequency of a wave equals the rate of _____ of the source that creates it.

D. Wave _____, or v , describes how fast the wave moves forward.

- _____ = wavelength \times _____, or $v = \lambda \times f$.
- Light waves travel _____ than sound waves.
- Sound waves travel faster in _____ and _____ than in gas.
- Light waves travel faster in _____ and _____ than in liquids and solids.

E. **Amplitude**—a measure of the _____ in a wave

- The more energy a wave carries, the _____ its amplitude.
- Amplitude of _____ waves is related to how tightly the medium is pushed together at the compression.
 - The _____ the compressions, the larger the amplitude is and the more energy the wave carries.
 - The less dense the rarefactions, the _____ the amplitude and the more energy the wave carries.
- Amplitude of _____ waves
 - The distance from the crest or trough of a wave to the _____ of the medium
 - Example: how high an ocean wave appears above the water level

Section 3 The Behavior of Waves

A. Reflection occurs when a wave strikes an object and _____ of it.

- _____ types of waves can be reflected.
- The angle of incidence of a wave is always equal to the angle of _____.
 - Normal—an imaginary line _____ to a reflective surface
 - Angle of _____—the angle formed by the wave striking the surface and the normal
 - Angle of _____—the angle formed by the reflected wave and the normal

Note-taking Worksheet (continued)

B. Refraction—the _____ of a wave caused by a change in its speed as it moves from one medium to another

1. The greater the change in speed is, the _____ the wave bends.
2. When a wave passes into a material that slows it down, the wave is bent _____ the normal.
3. When a wave passes into a material that speeds it up, the wave is bent _____ the normal.

C. Diffraction—an object causes a wave to change direction and _____ around it

1. If the obstacle is _____ than the wavelength, the wave diffracts a lot.
2. If the obstacle is much _____ than the wavelength, the wave does not diffract much.
3. The larger the obstacle is compared to the wavelength, the _____ the waves will diffract.

D. Interference—the ability of two or more waves to _____ and form a new wave

1. Waves pass right through each other and continue in _____.
2. New wave exists only while the two original waves continue to _____.
3. Constructive interference—waves _____ together
4. Destructive interference—waves _____ from each other

E. Standing waves—a wave pattern that stays in _____

1. Form when waves of equal _____ and amplitude that are traveling in _____ directions continuously interfere with each other
2. Nodes—the places where two waves _____ cancel each other

F. Resonance—the ability of an object to _____ by absorbing energy at its natural frequency