

**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

1. Expressed in _____
2. As frequency increases, wavelength _____.
3. 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.

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

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

1. The more energy a wave carries, the _____ its amplitude.
2. Amplitude of _____ waves is related to how tightly the medium is pushed together at the compression.
 - a. The _____ the compressions, the larger the amplitude is and the more energy the wave carries.
 - b. The less dense the rarefactions, the _____ the amplitude and the more energy the wave carries.
3. Amplitude of _____ waves
 - a. The distance from the crest or trough of a wave to the _____ of the medium
 - b. 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.

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