All About Waves—Notes Outline

A ___________ is a disturbance that carries ___________ from one place to another.

_________ is NOT carried with the wave! A wave can move through matter (a ___________).

If it must have a medium, it is called ___________ wave. If it can travel without a medium
(such as in space), it is called ___________ wave.

Wave Types
1. ____________ waves: Waves in which the medium moves at _______ angles to the wave direction.
Parts of a transverse wave:
_________ : the highest point of the wave
_________ : the _______ point of the wave
2. ___________ (longitudinal) wave: Waves in which the medium moves ___________ in the
same direction as the wave.
Parts of a compressional wave:
_________ : where the particles are close together
_________ : where the particles are spread apart

Wave properties depend on what _____________ makes the wave.
1. _______ : The distance between one point on a wave and the ____________________________
on the next wave.
2. _______ : How many waves go past a point in _______; measured in _______ (Hz). The
higher the frequency, the more _______ in the wave.
3. _______ : How far the medium (crests and troughs, or compressions and rarefactions) moves
from _____________ (the place the medium is when not moving). The _______ energy
a wave carries, the _______ its amplitude. Amplitude is related to energy by _____________.
4. _______ : Depends on the medium the wave is traveling in. This varies in ________,
_________ and ________.
   Equation for calculating wave speed:
   wave speed = _______ (in m) x _______ (in Hz)

Problem: So- if a wave has a wave speed of 1000 m/s and a frequency of 500 Hz, what is its
wave length? Answer: wavelength= ____________

Changing Wave Direction
1. _______ : When waves __________ off a surface. If the surface is
_________ , the angle at which the wave hits the surface will be the
_________ as the angle that the wave __________ the surface. In
other words, the angle _____ equals the angle _____. This is called the
_________ ___________.
2. _______ : Waves can __________; this happens when a wave enters
a __________ and its __________; the amount of bending depends on
the medium it is entering
3. _______ : The bending of waves _______ an object. The amount
of bending depends on the ___________ and the _____________.
   _______ obstacle, _______ wavelength = low diffraction

Waves and Wave Properties Lesson—All About Waves—Notes Outline
A wave is a disturbance that carries energy from one place to another.

Matter is NOT carried with the wave! A wave can move through matter (a medium). If it must have a medium, it is called a mechanical wave. If it can travel without a medium (such as in space), it is called an electromagnetic wave.

**Wave Types**

1. **Transverse waves**: Waves in which the medium moves at right angles to the wave direction.
   - Parts of a transverse wave:
     - crest: the highest point of the wave
     - trough: the lowest point of the wave
2. **Compressional (longitudinal) wave**: Waves in which the medium moves back and forth in the same direction as the wave.
   - Parts of a compressional wave:
     - compression: where the particles are close together
     - rarefaction: where the particles are spread apart

**Wave properties** depend on what type of energy makes the wave.

1. **wavelength**: The distance between one point on a wave and the exact same place on the next wave.
2. **frequency**: How many waves go past a point in one second; measured in hertz (Hz). The higher the frequency, the more energy in the wave.
3. **amplitude**: How far the medium (crests and troughs, or compressions and rarefactions) moves from rest position (the place the medium is when not moving). The more energy a wave carries, the larger its amplitude. Amplitude is related to energy by \( E = CA^2 \).
4. **wave speed**: Depends on the medium the wave is traveling in. This varies in solids, liquids and gases.

   Equation for calculating wave speed:
   \[
   \text{wave speed} = \text{wavelength (in m)} \times \text{frequency (in Hz)}
   \]

**Problem**: So- if a wave has a wave speed of 1000 m/s and a frequency of 500 Hz, what is its wavelength? Answer: wavelength = 2 m

**Changing Wave Direction**

1. **reflection**: When waves bounce off a surface. If the surface is flat, the angle at which the wave hits the surface will be the same as the angle that the wave leaves the surface. In other words, the angle in equals the angle out. This is called the law of reflection.
2. **refraction**: Waves can bend; this happens when a wave enters a medium and its speed changes; the amount of bending depends on the medium it is entering
3. **diffraction**: The bending of waves around an object. The amount of bending depends on the size of the obstacle and the size of the waves.
large obstacle, small wavelength = low diffraction
small obstacle, large wavelength = large diffraction