Chapter 17 and 18 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Waves (Mechanical and Electromagnetic) Mr. Rosener

Section 1: Waves

Where do waves get Energy?

* Ultimately from \_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_ – any movement that follows the same path repeatedly
* A \_\_\_\_\_\_\_\_\_\_\_\_\_object gives off its \_\_\_\_\_\_\_\_\_\_ to nearby particles next to them.
* These particles in turn give off \_\_\_\_\_\_\_\_\_ to the particles next to them

**What Are Mechanical Waves?**

* a disturbance in matter that **\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_** from one place to another.
* Mechanical waves require \_\_\_\_\_\_\_\_\_ to travel through.
* The material through which a wave travels is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* **A mechanical wave is created when a source of energy causes a \_\_\_\_\_\_\_\_\_\_\_\_ to travel through a medium.**

**What Are Electromagnetic Waves?**

* Transverse waves consisting of \_\_\_\_\_\_\_\_\_\_\_\_\_ electric fields and changing magnetic fields.



**How They Are Produced**

* Electromagnetic waves are produced by constantly changing \_\_\_\_\_\_\_\_\_\_\_\_\_.
* Electric fields are produced by electrically charged \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and by changing magnetic fields.
* Magnetic fields are produced by \_\_\_\_\_\_\_\_, by changing \_\_\_\_\_\_\_\_\_ fields, and by \_\_\_\_\_\_\_\_\_\_\_\_ charges.
* **Electromagnetic waves are produced when an electric charge \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_.**

**How They Travel**

* **Electromagnetic waves can travel through a \_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_ space, as well as through \_\_\_\_\_\_\_\_\_\_\_\_.**
* The transfer of \_\_\_\_\_\_\_\_\_\_ by electromagnetic waves traveling through matter or across space is called electromagnetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

***Types of Mechanical and Electromagnetic Waves***

**Transverse Waves**

a wave that causes the medium to \_\_\_\_\_\_\_\_\_\_\_ at \_\_\_\_\_\_\_\_\_\_ angles to the direction in which the wave travels.



* The highest point of the wave above the rest position is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* The lowest point below the rest position is the **\_\_\_\_\_\_\_\_\_\_**
* Before the wave starts, every point on the rope is in its **\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_**, represented by the dashed line.

**Longitudinal Waves**

* is a wave in which the \_\_\_\_\_\_\_\_\_\_\_\_\_ of the medium is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the direction the wave travels.



* An area where the particles in a medium are spaced close together is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* An area where the particles in a medium are spread out is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Surface Waves**

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| * a wave that travels along a \_\_\_\_\_\_\_\_\_ separating two \_\_\_\_\_\_\_\_\_. * A \_\_\_\_\_\_\_\_\_\_\_\_\_ Wave   Section 2: **Properties of Mechanical Waves**  There are many different kinds of Waves   * All waves have amplitude, wavelength, and frequency   **Frequency and Period**   * Any motion that repeats at regular time intervals is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** * The time required for one cycle, a complete motion that returns to its starting point, is called the **\_\_\_\_\_\_\_\_\_\_\_\_.** * Any periodic motion has a **\_\_\_\_\_\_\_\_\_\_\_,** which is the number of complete cycles in a given time. * Frequency is measured in cycles per second, or **\_\_\_\_\_\_** (Hz). * **A wave’s frequency equals the frequency of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ source producing the wave.**     **Wavelength**   * the distance between a \_\_\_\_\_\_\_ on one wave and the same \_\_\_\_\_\_\_ on the next cycle of the wave.      * Actually wavelength can be measured from \_\_\_\_\_\_\_\_\_ on the wave as long as it is measured to the \_\_\_\_\_\_\_ on the next wave   **Frequency and Wavelength**   * **\_\_\_\_\_\_\_\_\_\_\_\_ the frequency of a wave \_\_\_\_\_\_\_\_\_ its wavelength.**     **Wave Speed**   * Formula: * The speed of a wave can change if it enters a new \_\_\_\_\_\_\_\_ or if variables such as \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ change. * **If you assume that waves are traveling at a constant speed, then wavelength is \_\_\_\_\_\_\_\_\_\_\_\_ proportional to frequency**   **Amplitude**   * of a wave is the maximum \_\_\_\_\_\_\_\_\_\_\_\_\_ of the medium from its \_\_\_\_\_\_\_\_\_\_ position. * Amplitude represents the amount of \_\_\_\_\_\_\_\_\_\_ in a wave * **The more \_\_\_\_\_\_\_\_ a wave has, the greater is its \_\_\_\_\_\_\_.**   wave3a   * As \_\_\_\_\_\_\_\_\_\_\_ increases, particles of the medium are moved a \_\_\_\_\_\_\_\_\_\_\_\_\_ distance from the rest position * Can be positive or negative   wave3b  Section 3: **Behavior of Waves**  **Reflection**   * The \_\_\_\_\_\_\_\_\_\_\_ back of a wave after it strikes a boundary that does not \_\_\_\_\_\_\_\_\_\_ all the wave’s \_\_\_\_\_\_\_\_\_\_\_ * Angle of \_\_\_\_\_\_\_\_\_\_ = angle at which the wave hits the boundary * Angle of \_\_\_\_\_\_\_\_\_\_\_\_ = angle at which the wave bounces off the boundary * Angle of Incidence = Angle of Reflection * **Reflection does not change the \_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_ of a wave, but the wave can be flipped upside down.**  |  |  | | --- | --- | | aimg291  Angle of Incidence | aimg293  Angle of Reflection |   **Refraction**   * The \_\_\_\_\_\_\_\_ of waves due to a change in \_\_\_\_\_\_\_\_\_\_. * Occurs because waves move at different \_\_\_\_\_\_\_ through different mediums. * **When a wave enters a medium at an \_\_\_\_\_\_\_, refraction occurs because one side of the wave moves more \_\_\_\_\_\_\_\_ than the other side.**  |  |  | | --- | --- | | refract4 |  |   **Diffraction**   * The \_\_\_\_\_\_\_\_ of waves \_\_\_\_\_\_\_\_\_\_ the edge of an obstacle * Diffraction is the result of a new series of \_\_\_\_\_\_\_\_\_\_\_ being formed when the original waves \_\_\_\_\_\_\_\_ an obstacle. * **A wave diffracts more if its wavelength is \_\_\_\_\_\_\_\_\_ compared to the size of an opening or obstacle.**   difrimg25   |  |  | | --- | --- | |  |  |   **Interference**   * When two waves \_\_\_\_\_\_\_\_\_ in the same \_\_\_\_\_\_\_\_ at the same \_\_\_\_\_\_\_\_\_, they interact * There are two types of interaction: * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – waves combine in such a way that the disturbance that results is greater than either wave alone * \_\_\_\_\_\_\_\_\_\_\_\_\_ interference – waves combine in such a way that the disturbance that results is less than either wave alone  |  |  | | --- | --- | | tot_con_inter | tot_dest_inter |   **Standing Waves**   * A wave that does \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ to be moving * Two parts of a Standing Wave * \_\_\_\_\_\_\_\_\_\_\_\_\_: where destructive interference results in no energy displacement * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: where constructive interference causes maximum energy displacement * **A standing wave forms only if \_\_\_\_\_\_\_\_\_\_ a wavelength or a multiple of half a wavelength fits exactly into the length of a vibrating cord.**   **The Electromagnetic Spectrum**  Electromagnetic Spectrum   * Electromagnetic waves are arranged in order of \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * It ranges form very \_\_\_\_\_\_ wavelengths(\_\_\_\_\_\_ frequency) to very \_\_\_\_\_\_\_\_\_\_ wavelengths(\_\_\_\_\_\_\_\_\_ frequency)   emschart |  |