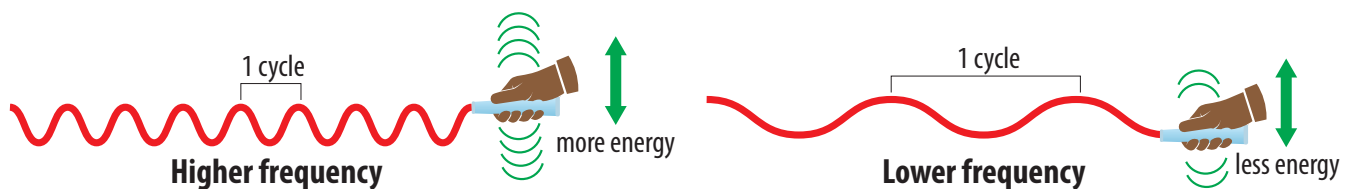


Sample Lesson #1

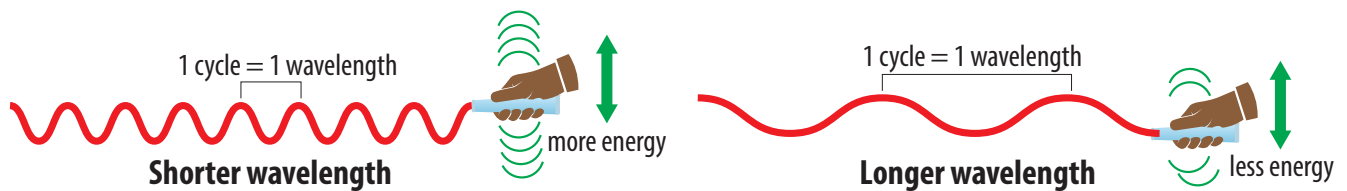
Properties of Waves

A wave can be described by its properties: frequency, wavelength, and amplitude. These properties are related to the disturbance that creates the wave.

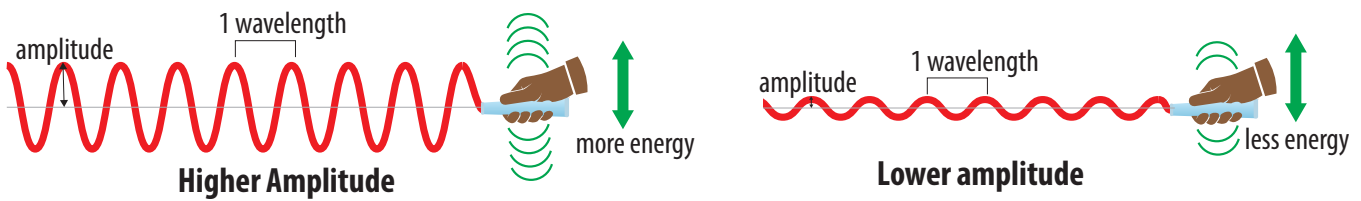
For example, moving the end of a rope up and down creates a transverse wave with a series of crests and troughs. **Frequency** is a measure of how many crests and troughs (how many cycles) occur in one second. Moving the rope rapidly, with a great deal of energy, creates a wave with many crests and troughs. Moving the end of the rope slowly, with less energy, creates a wave with fewer crests and troughs in the same amount of time. The SI unit for frequency is hertz (Hz). Frequency is determined by the disturbance. Frequency does not change unless the disturbance changes.



The distance from crest to crest or from trough to trough is called the **wavelength**. Wavelength is a distance. It can be measured in units such as meters, centimeters, or nanometers. Wavelength and frequency are inversely related. If a wave has a high frequency, it has a short wavelength. If a wave has a low frequency, it has a long wavelength.

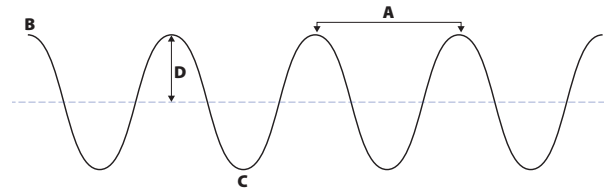


A wave's **resting position** is where the rope would sit if there were no disturbance. **Amplitude** is the maximum distance the wave varies from its resting position. It is the distance between the resting position and a crest or the distance between the resting position and a trough. The amplitude of a wave is determined by the energy in the disturbance. A wave with a higher amplitude has more energy than a wave with a lower amplitude.



1. Study the diagram. Next to each term, write the letter that identifies the wave part.

- _____ amplitude
- _____ trough
- _____ wavelength
- _____ crest



2. True or False? Explain your answer.

_____ The frequency of a wave is not dependent on the disturbance that caused the wave.

3. A cycle consists of one _____ and one _____.

A hertz is the number of cycles that pass by in one _____.

4. Amplitude and wavelength are distances. Choose the units that can be used to measure amplitude or wavelength.

- nanometers millimeters liters hertz meters joules

5. The greater the amplitude of a wave, the (more / less) energy the wave has.

The greater the frequency of a wave, the (more / less) energy the wave has.

6. Andre makes a grilled cheese sandwich and wants it to stay warm for later. Wrapping his sandwich in _____ is more likely to keep it warm.

- aluminum foil layers of paper towels

Explain.

7. The opposite poles of two magnets are touching each other. To pull the magnets apart, energy is (required / released).

That energy is _____.

- A) destroyed
- B) transferred to the person that is pulling
- C) transferred to the magnetic field
- D) a combination of A and C