17.2 – Properties of Mechanical Waves

Properties of Mechanical Waves

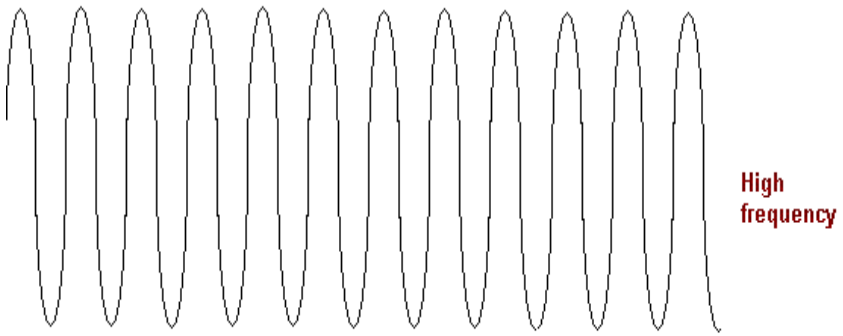
Period Motion

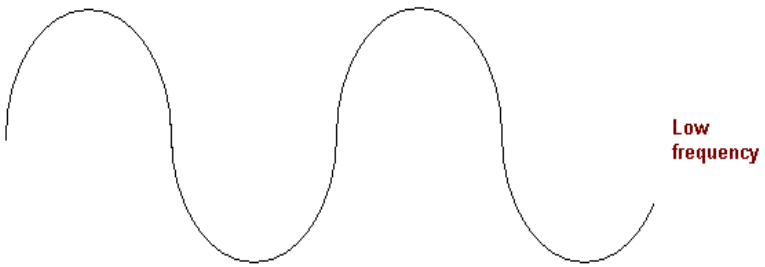
Any motion that repeats at regular time intervals

Frequency

Number of complete cycles in a given time

- Frequency is measured in Hertz (Hz)

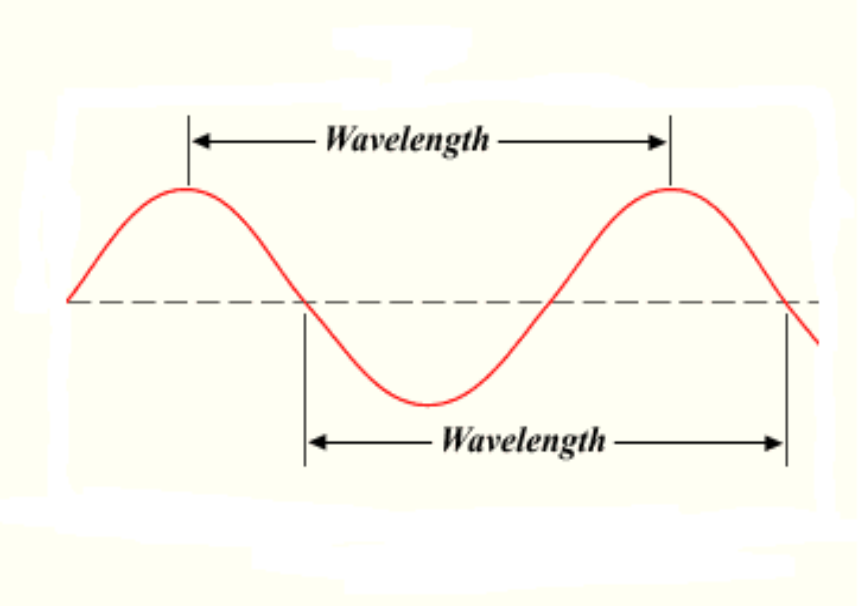




Properties of Mechanical Waves

Wavelength

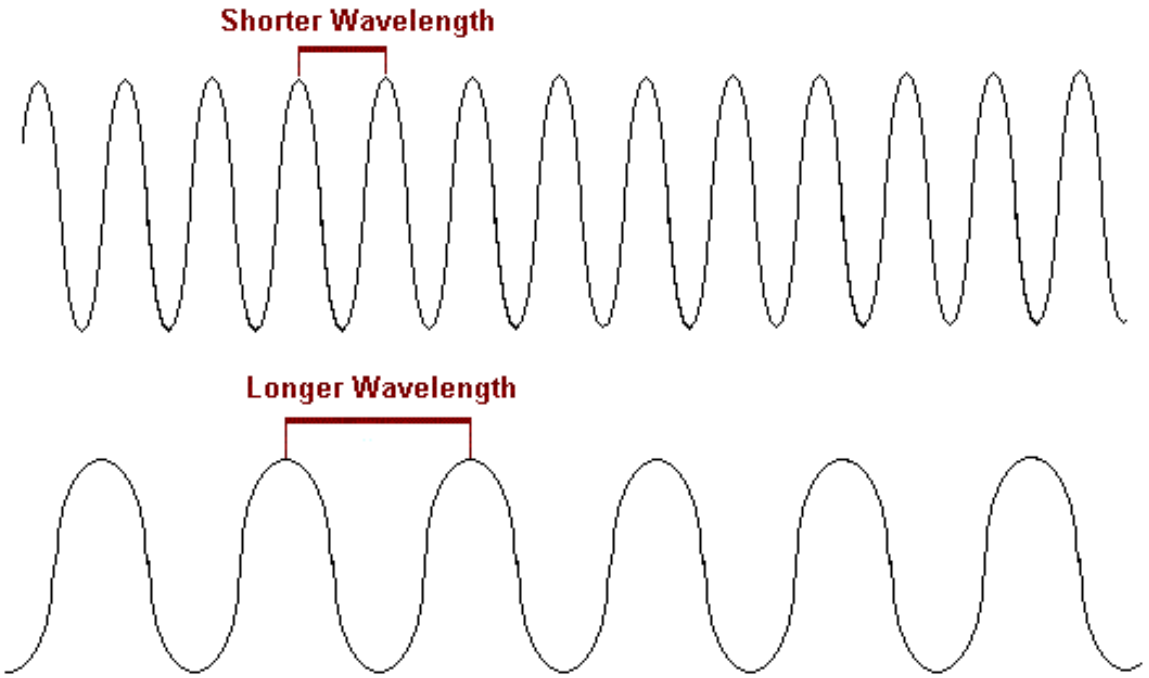
The distance between a point on one wave and the same point on the next cycle of the wave.



Properties of Mechanical Waves

Key point

Increasing the frequency of a wave decreases its wavelength.



Wave Speed

Speed of Waves

Speed = wavelength x frequency

- **Speed = m/s**
- **Wavelength = meters (m)**
- **Frequency = Hertz (Hz)**

Wave Speed Examples

Example #1

A wave on a rope has a wavelength of 2 meters and a frequency of 2 Hz. What is the speed of the wave?

Example #2

A motorboat is tied to a dock with its motor running. The spinning propeller makes a surface wave with the water with a frequency of 4 Hz and a wavelength of 0.1 meters. What is the speed of the wave?

Example #3

What is the wavelength of an earthquake wave if it has a speed of 5,000 m/s and a frequency of 10 Hz?

Wave Speed

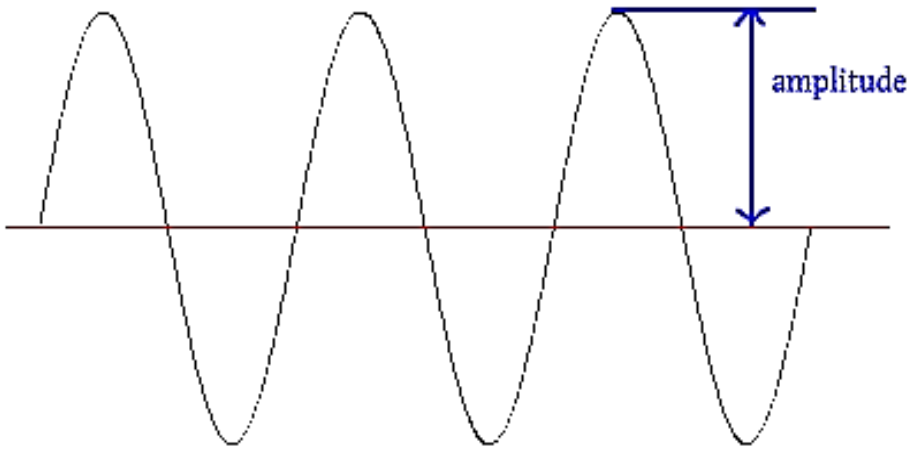
- The speed of a wave changes when it enters a new medium.
- Frequency and wavelength are inversely proportional meaning when one goes up, the other goes down.

Properties of Mechanical Waves

Amplitude

The maximum displacement of the medium from rest position.

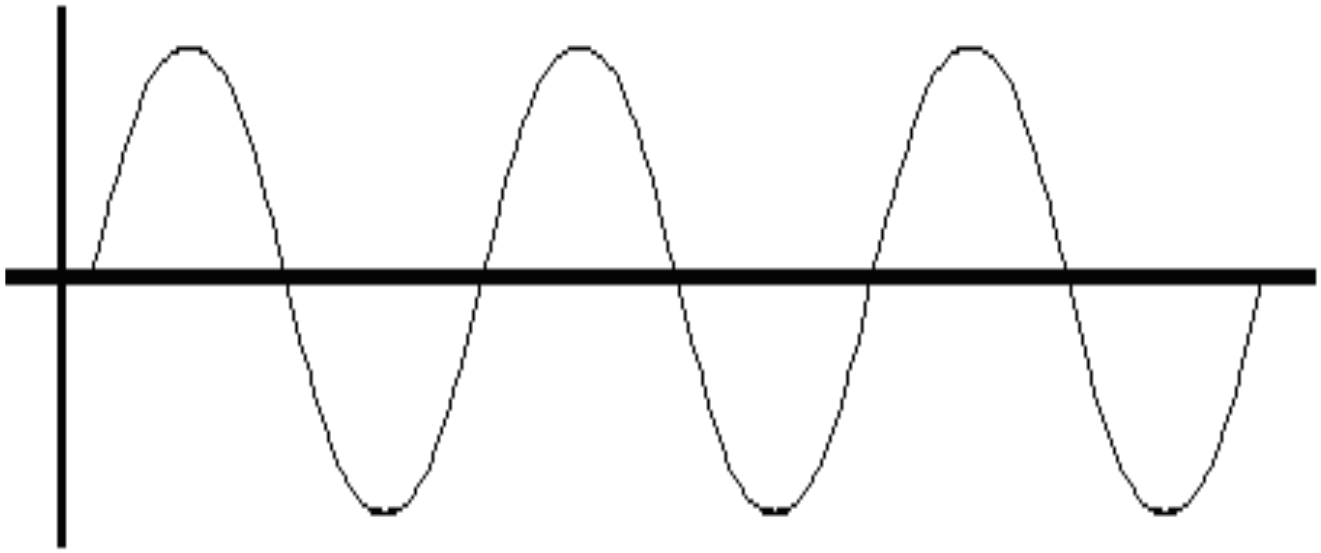
- **The more energy a wave has, the greater the amplitude**



Properties of Mechanical Waves

Label the following in the wave below:

- ✓ **Rest Position**
- ✓ **Wavelength**
- ✓ **Crest**
- ✓ **Trough**
- ✓ **Amplitude**



Properties of Mechanical Waves

Label the following in the wave below:

- ✓ **Rest Position**
- ✓ **Wavelength**
- ✓ **Compression**
- ✓ **Rarefaction**
- ✓ **Amplitude**