

**PHYSICS STUDY GUIDE**  
**CHAPTER 15: WAVES**

**1. SIMPLE HARMONIC MOTION**

Vibration about an equilibrium position in which a restoring force is proportional to the displacement from equilibrium.

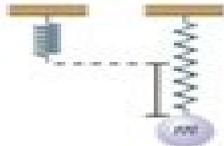


A simple pendulum consists of a mass called a bob, which is attached to a fixed string.

**Period of a simple pendulum:**

$$T = 2 \cdot \pi \cdot \sqrt{\frac{L}{g}}$$

T =	Period	(seconds)
L =	Length of the string	(meters)
g =	gravitational constant	(m/s <sup>2</sup> )



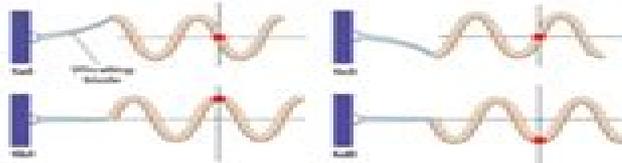
A mass-spring system consists of a mass hanging at the bottom of a spring.

**Period of a mass-spring system:**

$$T = 2 \cdot \pi \cdot \sqrt{\frac{m}{k}}$$

T =	Period	(seconds)
m =	mass	(kilograms)
k =	Spring constant	(N/m)

**2. WAVES**



- Waves are disturbances that travel in time.
- Waves are created by a vibrating source.
- Waves are created in a sinusoidal shape.

**DEFINITIONS**

- **Medium:** A physical environment through which a disturbance can travel.
- **Transverse wave:** A wave whose particles vibrate perpendicularly to the direction the wave is traveling.
- **Longitudinal wave:** A wave whose particles vibrate parallel to the direction the wave is traveling.
- **Mechanical wave:** A wave that requires a medium through which to travel.
- **Electromagnetic wave:** A wave that DOES NOT require a medium through which to travel.
- **Crest:** The highest point above the equilibrium position.
- **Trough:** The lowest point below the equilibrium position.
- **Compression:** Section of a longitudinal wave of high density.
- **Rerefaction:** Section of a longitudinal wave of low density.

# Physics Study Guide Chapter 15

**Mansoor Khan**



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