

# Waves

**Enduring Understanding** - Waves interact with their environment, exhibiting a variety of wave phenomena.

**BOLD** lined boxes mean Pre-AP ONLY

## Mechanical Waves

A disturbance that moves through a medium.

## Electromagnetic Waves

A periodic disturbance of electric and magnetic fields. (Next Unit)

**Essential Question**  
How does wavelength response to wave speed and frequency?

Wave Types and Properties

Speed Wavelength Frequency Medium

Wave Speed

Transverse Wave

Longitudinal Wave

Wave Equation  
 $v = \lambda f$

Pulse Equation  
 $\Delta d = v_c t$

Snaky Lab

Echo Lab

**Essential Question**  
What do waves do: bounce or pass through?

Superposition

Reflection

Constructive

Destructive

Fixed End Reflection

Free End Reflection

Reflection and Superposition Lab

**Essential Question**  
What do all standing wave patterns have in common?

Standing Waves

Consecutive Pattern Difference Equals 1/2 a Wavelength

Harmonic Patterns

Resonance Lab

Two Fixed Ends Two Free Ends

One Fixed One Free End

$$\lambda_n = \frac{2L}{n}$$

$$\lambda_n = \frac{4L}{n}$$

Reflection

Refraction

Diffraction

Interference

Doppler Effect

**Essential Question**  
How many different ways can wave phenomena be illustrated?

Beats

Wave Phenomena

Ripple Tank Lab



GravityKills