

- What simple harmonic motion is and be able to solve problems involving mass on springs and pendulums.
 - Ex:** What is the period of a swinging mass of 0.5 kg that is .38 meters long?
 - Ex:** What is the period of a 0.5 kg mass bouncing up and down on a spring with a spring constant of 30 N/m?
- That waves carry ENERGY (not stuff) from one place to another.
- How to identify transverse and longitudinal waves.
 - Ex:** Is sound a transverse wave or longitudinal? How about the “wave” at sporting events?
- How to solve problems involving wavelength, frequency and wave speed.
 - Ex:** If a wave has a velocity of 340 m/s and a frequency of 440 Hz, what is the wavelength?
 - Ex:** What is the speed of a wave that has a frequency of 300Hz and a $\lambda = 2.5$ meters?
- That sound is a longitudinal wave whose speed depends on the properties of the medium it travels through. (air, liquid, solid, etc.)
 - Ex:** What is faster the speed of sound in air or water?
 - Ex:** What is faster the speed of sound in 20 °C air or 30 °C air?
- How to distinguish between constructive and destructive interference in waves.
 - Ex:** Draw the waves below when they are overlapping. Is this constructive or destructive interference?
- How “beats” are created and how to calculate beat frequency.
 - Ex:** A tuning fork of 230 Hz is sounded next to a guitar string of unknown frequency. The beats frequency is 4 Hz. What are the two possible frequencies of the guitar string?
 - Ex:** Two trumpets play at the same time – one has a frequency of 200 Hz and the other 201 Hz. Calculate the beat frequency that you will hear.
- How the Doppler effect works and predict the change in pitch an observer will hear as a sound source approaches and then passes by the observer.
 - Ex:** As a fire engine approaches you will the siren sound higher or lower? How about as it goes away from you? Can you explain why this happens?
- How to label the parts of a wave: crest, trough, wavelength, amplitude, and equilibrium point.
 - Ex: Label the diagram ->**
- What a node and an antinode are on a standing wave.
- Know the difference between the terms infrasonic, ultrasonic and supersonic.
- How to explain resonance AND give examples (bridge, grape juice glass, kid on swing, etc.)
- How sound intensity varies with distance (no calculations though!)
- How to calculate and be able to draw standing wave harmonics for a string, open pipe, and closed pipe type instrument. **Ex:** Draw harmonics
- One “football” or loop = half a wavelength.
- The relationship between frequency and pitch of a sound.
- The relationship between sound intensity and amplitude and wavelength.

