**Waves and Sound**

**Ch 14 & 15**

**Objectives:**

**Describe** the force in an elastic spring

**Determine** the energy stored in an elastic string

**Compare** simple harmonic motion and the motion of a pendulum

**Identify** how wave transfer energy without transferring matter

**Contrast** transverse and longitudinal waves

**Relate** wave speed, wavelength, and frequency

**Relate** a wave’s speed to the medium in which it travels

**Describe** how waves are reflected and refracted at boundaries between media

**Apply** the principle of superposition to the phenomenon of interference

**Demonstrate** the properties the sound shares with other waves

**Relate** the physical properties of sound to our perception of sound

**Identify** some applications of the Doppler Effect

**Describe** the origin of sound

**Demonstrate** an understanding of resonance especially applied to strings and air columns

**Explain** why there are variations in sound among instruments and among voices

**Vocabulary:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Periodic Motion | Simple Harmonic Motion | Period | Amplitude | Hooke’s Law |
| Pendulum | Resonance | Wave | Wave Pulse | Periodic Wave |
| Transverse Wave | Longitudinal Wave | Surface Wave | Trough | Crest |
| Wavelength | Frequency | Incident Wave | Reflected Wave | Principle of Superposition |
| Interference | Node | Antinode | Standing Wave | Wave Front |
| Ray | Normal | Law of Reflection | Refraction | Sound wave |
| Pitch | Loudness | Sound Level | Decibel | Doppler Effect |
| Closed-Pipe Resonator | Open-Pipe Resonator | Fundamental Frequency | Harmonics | Dissonance Tone |
| Consonance Tone | Beats |  |  |  |

**Formulas:**

F = -kx

PEsp = ½kx2

T = $2π\sqrt{\frac{l}{g}}$

λ = $\frac{v}{f}$

f = $\frac{1}{T}$

vsound = 331$^{m}/\_{s}$ + .6(T°C)

fd = $\left[\frac{\left(1\pm \frac{v\_{o}}{v\_{Sd}}\right)}{\left(1\pm \frac{v\_{s}}{v\_{Sd}}\right)}\right]$fs

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| Date | Topic | Book Chapter: Read & Notes | Practice Probs.  | Section Review Questions | End of Chapter Questions and Problems  | Problem Sets | Test |
|  | Periodic Motion | Ch 14.1 | 1-5, 6-8 | 9-13 | 32-34,36-39, 69-72, 74 |  |  |
|  | Waves Properties | Ch 14.2 | 15-21 | 23 | 41-48,50-51,75-82 |  |  |
|  | Wave Behavior | Ch 14.3 |  | 27-29 | 52-56,59-68, 86-87 |  |  |
|  | Properties of Sound | Ch 15.1 | 1-5, 6-9 | 12-16 | 31-34, 52-55,57-64, 66-70 |  |  |
|  | Physics of Music | Ch 15.2 | 18-21 | 22-28 | 36-41,42-51, 72-81, 87-90 |  |  |
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