

- 1) Simple Harmonic Motion
 - a) Restoring force is proportional to displacement
 - b) Be able to recognize examples of SHM
 - c) In SHM, restoring force and acceleration are max at max displacement, and speed is max at equilibrium.
- 2) Properties of waves
 - a) As a wave travels, particles of the medium vibrate around an equilibrium position.
 - b) Transverse wave
 - i) Vibrations are perpendicular to direction of wave travel
 - c) Longitudinal wave
 - i) Vibrations are parallel to direction of wave travel
- 3) Wave interaction
 - a) Two or more waves are moving through a medium, the resultant wave is found by adding the individual displacements together.
 - b) Mechanical waves are not matter, but rather displacements of matter
- 4) Sound waves
 - a) Frequency of a sound wave determines its pitch
 - b) Speed of sound depends on the medium
- 5) Doppler Effect
 - a) Apparent frequency shift between source of waves and an observer
- 6) Electromagnetic Radiation
 - a) Light
 - i) Consists of oscillating electric and magnetic fields
 - ii) Frequency times wavelength of electromagnetic radiation is equal to c , the speed of light
 - iii) Light obeys law of reflection, incoming (incident) and reflected angles of light are equal.
 - b) Electromagnetic Spectrum
 - i) Energy transported by EM waves is called electromagnetic radiation.
 - ii) Radio Waves
 - (1) Longest wavelength
 - (a) Easily travel around objects
 - (b) Transmit info over long distances
 - iii) Microwaves
 - (1) Part of the radio spectrum
 - (a) Used to study stars, talk to satellites, heat up food
 - iv) Infrared
 - (1) Between Microwaves and visible light
 - (a) Far-infrared radiation
 - (i) Heat given off by anything warm
 1. Sunlight, warm sidewalk, your body
 - (b) Near-infrared radiation
 - (i) TV remote controls, burglar alarms
 - v) Visible light
 - (1) Visible to human eye

vi) Ultraviolet

(1) Wavelengths are shorter than visible light

(a) Just beyond violet

(b) Responsible for causing sun burns

(c) Small portion of UV waves that sun emits penetrate Earth's atmosphere. Gases (ozone) block most of the UV waves

(d) Used as a disinfectant to kill bacteria, sterilize equipment

vii) X-rays

(1) Short wavelengths

viii) Gamma Rays

(1) Shortest wavelength – described by their energy

(2) Can kill living cells

(3) Used in medicine to destroy cancer cells