Waves

Period (T)

T is the time it takes an object to return to its starting point

Frequency (f)

of cycles an object goes through in 1 second (Hertz)

Amplitude (A)

Distance from center of motion to either its lowest or highest point

Wavelength

How long 1 wave is 1 oscillation

- A medium is what the wave travels through.
  - a medium is temporarily disturbed
  - the mediom's molecules do not move
- Two main types of waves
  - Longitudal waves
    - Vibrations are same direction as wave motion
  - Transverse waves
    - Vibrations are perpendicular to wave motion

Electromagnetic waves

What are they?

Waves that consist of vibrating electric and magnetic fields

Can transfer energy through matter + across empty space

Force

A magnet exerts force over an area around it. (Doesn't need to touch it)

How they begin

They begin when an electric charged particle vibrates. This makes the surrounding field vibrate too. Two types of vibrating make an EM waves ∴ oscillate a charged particle

How they travel

Elec. and mag. feilds making EM waves are perpendicular. (transverse wave)

'propogates'

Ions, protons, and electrons

Interactions

- Reflect (bounce)
- Refract (bend)
- Diffract (spread)

Sources

From sun (mostly)
Provide energy
Others from tech.

Electromagnetic Spectrum

What is it?

Occurs in diff waves
EM radiation = Spectrum
MEANS there aren't discrete diff. Sections

Speed, Frequency, & Wave length

Speed relies on medium.
In a vacuum, all EM waves have same speed, "c" $C \approx 299{,}792{,}458$ m/s (Speed of light)

Wave speed = frequency · wave length
$f = c/\lambda$

λ = wavelength

WAVE is the same as RADIATION

Radio Waves

range of EM waves with long λ and low f

Microwaves

Short λ high f + more energy
- cell phone
- radar

smaller wave means higher frequency

Light

mid - λ called light
short λ
high freq

Visible

between ir + uv
combined = white

Invisible

IR
- lower than red
- heat

UV
- higher than violet
- kill bact.
- skin makes vit. D
- Sunburn/cancer

X rays

- hi-E EM waves
- pass thru soft but not hard/dense
- cancer

Gamma Rays

- most E of all λ
- pass thru most
- help cancer