What is Light?

- Light has both wave-like and particle-like properties.

- In the 1600s, a Dutch scientist named Christiaan Huygens showed that light behaves like a wave (Grandinetti.org).
Properties of Waves

- **Frequency**: The number of crests that pass a given point within 1 second.
- One cycle per second is called a Hertz (Hz).
- Written as $1/s$ or $s^{-1}$.
Properties of Waves

- **Wavelength**: The distance between crests.
- Wavelength and frequency are inversely proportional:
  
  Shorter wavelength = higher frequency

- \( c = \lambda v \) where \( \lambda \) is wavelength (m), \( v \) is frequency (Hz), and \( c \) is the speed of light (3.00 \( \times \) 10^8 m/s)
Properties of Waves

- **Amplitude**: The vertical distance between the tip of a crest and the wave's central axis. Associated with the brightness or intensity of the wave (nasa.gov).
Properties of Waves

- **Period**: The length of time it takes for one wavelength to pass by a given point in space (khanacademy.org).

\[ T = \frac{1}{f} \]

The lower the frequency is the longer the time period will be.
What are Photons?

- Light is comprised of photons - discrete packets of energy (nasa.gov).
- In other words, 1 photon is a very small amount of light.
- Photons are quantized
Photons contd.

- When an atom/molecule loses energy, it emits a photon that carries an energy equal to the loss in energy of the atom/molecule.
- Planck’s Equation

\[ E = h \nu \]

Where \( E \) is the energy of the photon absorbed or emitted (J), \( \nu \) is the frequency of the photon (Hz), and \( h \) is Planck’s constant \( (6.626 \times 10^{-34} \text{ J} \cdot \text{S}) \)
The Electromagnetic Spectrum

- Defined as the classification of electromagnetic waves according to their various wavelengths/frequencies.
What are Polarizers?

https://www.youtube.com/watch?v=MhhHPOxTUy8
Polarization

- Light can be polarized.

- **Polarization** - The measurement of the electromagnetic field’s alignment (nasa.gov).
Applications

- **Cameras** use polarizer filters to reduce glare from water and to manage reflections.

- Polarized **3D glasses** restrict the amount of light that reaches each eye for a 3D effect.
Thank you for your attention :D

Be Happy 'Cause Its Lunch Time

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