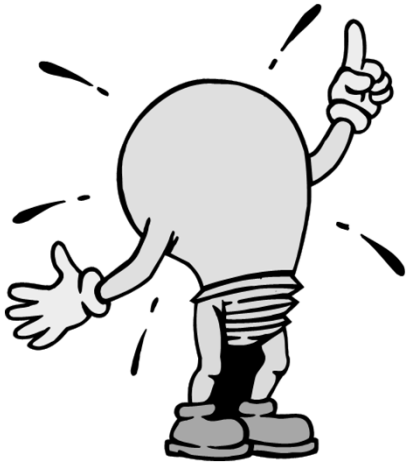
Light

What is it?



1

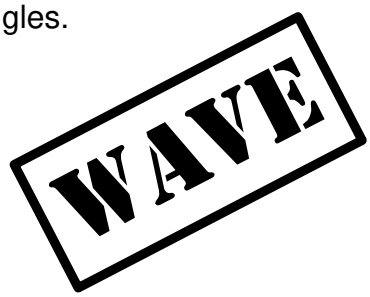
What is Light ?

- Is it a wave or a particle?
  - Either theory has to explain all properties of light
    - Reflection
    - Refraction
    - Interference
    - Diffraction
    - Photo Electric Effect
    - Propagation

2

What is Light ?

- Is it a wave or a particle?
  - Reflection
    - Light reflects off materials at equal angles.



3

What is Light ?

- Is it a wave or a particle?
  - Refraction
    - Light bends when it goes from one medium to another.

4

What is Light ?

- Is it a wave or a particle?
  - Interference
    - Light can constructively and destructively interfere with itself.

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What is Light ?

- Is it a wave or a particle?
  - Diffraction
    - Light can bend around the corners of narrow openings

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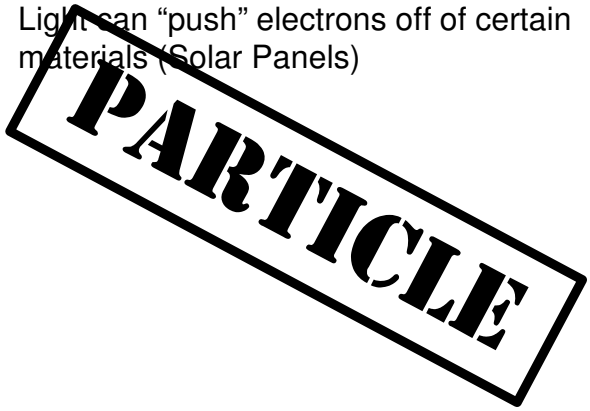
What is Light ?

- Is it a wave or a particle?
  - Photo Electric Effect
    - Light can “push” electrons off of certain materials (Solar Panels)



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What is Light ?

- Is it a wave or a particle?
  - Propagation
    - Light can travel through air, glass, water, and space.

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What is Light ?

- Is it a wave or a particle?
  - This topic has been debated by many different scientist for years.
  - Can be described as a combination of the both. For now, we will discuss it as a wave.
- Range of electromagnetic waves that move in distinct quantities that stimulate the eye.

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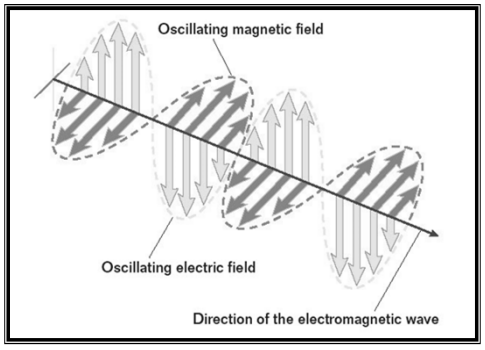
Electromagnetic Waves

- Transverse waves consisting of oscillating magnetic and electric fields at right angles to each other



- If light travels through space, from the sun to the earth, we know that electromagnetic waves do not require a medium – unlike mechanical waves such as sound

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The Electromagnetic Spectrum

The Electromagnetic Spectrum

	Radio	Microwaves	Infrared	Visible	Ultraviolet	X-Rays	Gamma
Example	TV/Radio	Microwave Oven	Remote (TV)	photography	sunburn	Medical X-Rays	Cancer Treatment
Wavelength	High	→					Low
Frequency	Low	→					High
Energy	Low	→					High
Danger	Low	→					High

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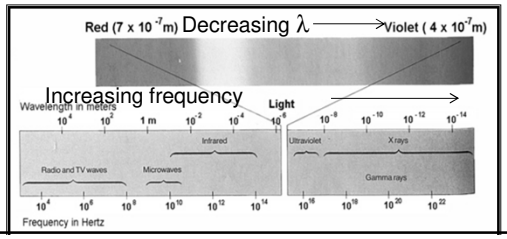
So…what is light ?

- A range of electromagnetic waves with wavelengths of 4×10^{-7} m to 7×10^{-7} m (400 nm to 700 nm) that stimulate the eye.
- Different wavelengths produce different colors.
- In order of decreasing wavelength (or increasing frequency) => Roy G. Biv

Light Colors

Color	Red	Orange	Yellow	Green	Blue	Indigo	Violet
Frequency	Low	→					High



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