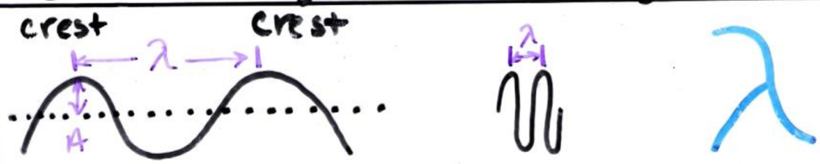
Electromagnetic Energy

waves



Amplitude (A): Brightness

wavelength (λ): peak-peak distance
lamda

frequency (ν):
- # of times wave passes a point
- "nu"
- Hertz (s^{-1}) cycles/sec

Energy: $\uparrow \nu \uparrow E$

$\uparrow \nu \downarrow \lambda$

Light (c):
- part of electromagnetic spectrum (see transparency #7)
- type of Energy
- $\boxed{c = \lambda \nu}$ inversely proportional
  ex: $\uparrow \lambda \downarrow \nu$
- $\boxed{c}$ = speed of light = $\boxed{3 \times 10^8 \text{ m/s}}$
- Spectrophotometers

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Flame Test — Show colored light emitted as e^- are excited and return to ground state energy level

"idea" — e^- have wavelike behavoir

light
- used to study changes in e^- behavior
- can have particle as well as wave like behavoir

photons (Plank)
- small packets of Energy (quanta)

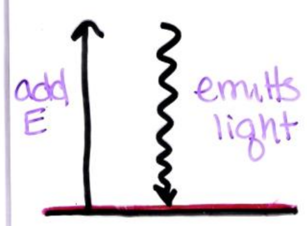
eqn. — $\boxed{E = h\nu}$ Energy related to frequency

Planks constant (h) — $\boxed{h = 6.6260755 \times 10^{-34}\ J/Hz}$

"idea" — e^- have particle behavoir

Theory: — e^- have both wave + particle behavoir

visually



Ground State

$E = h\nu$ + $c = \lambda\nu$ + $E = mc^2$ (Einstein)

if ν, λ or E is Known, can calc others.