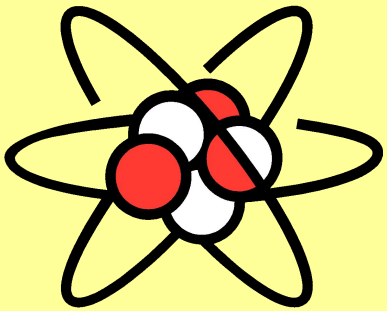
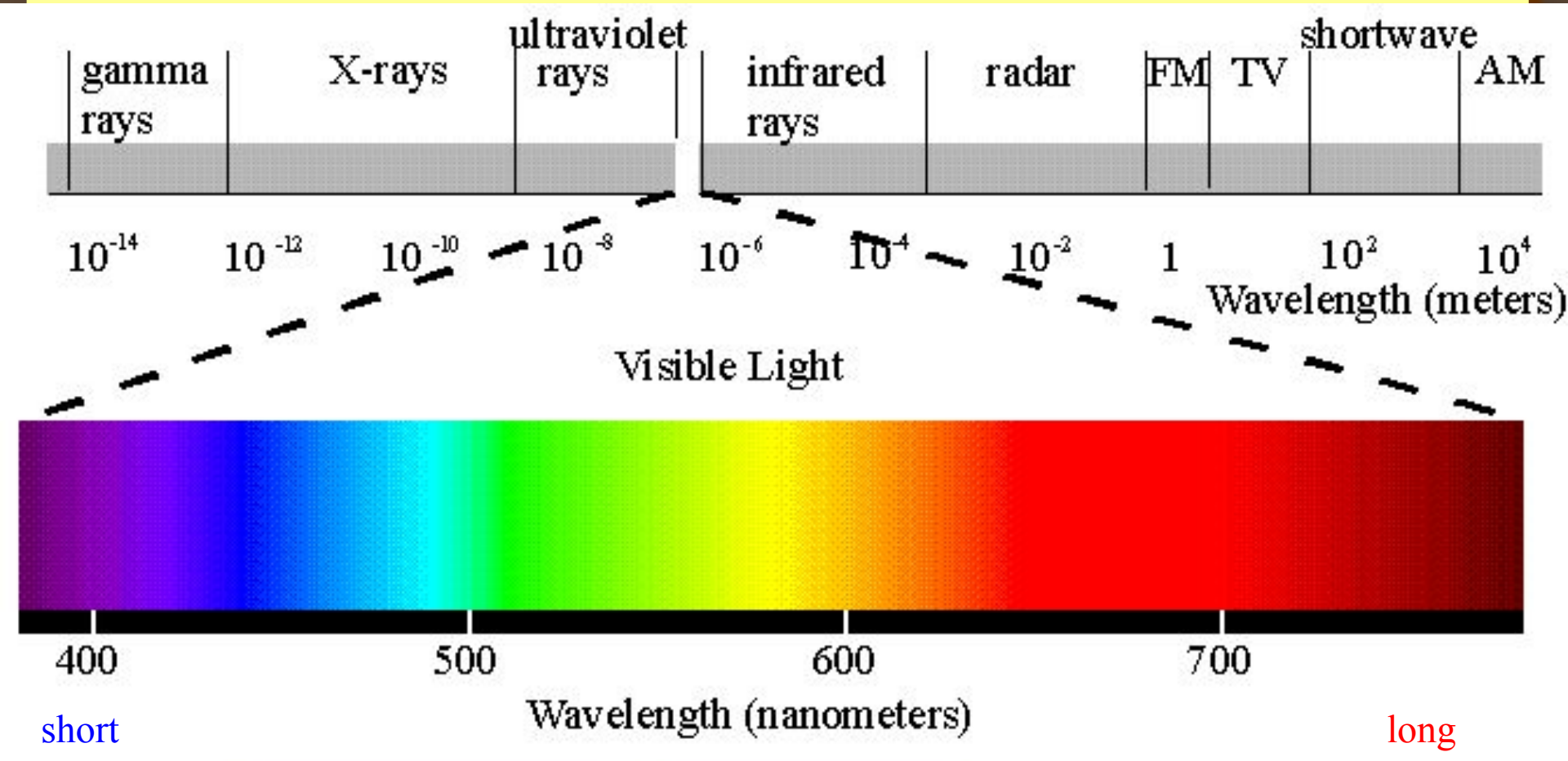
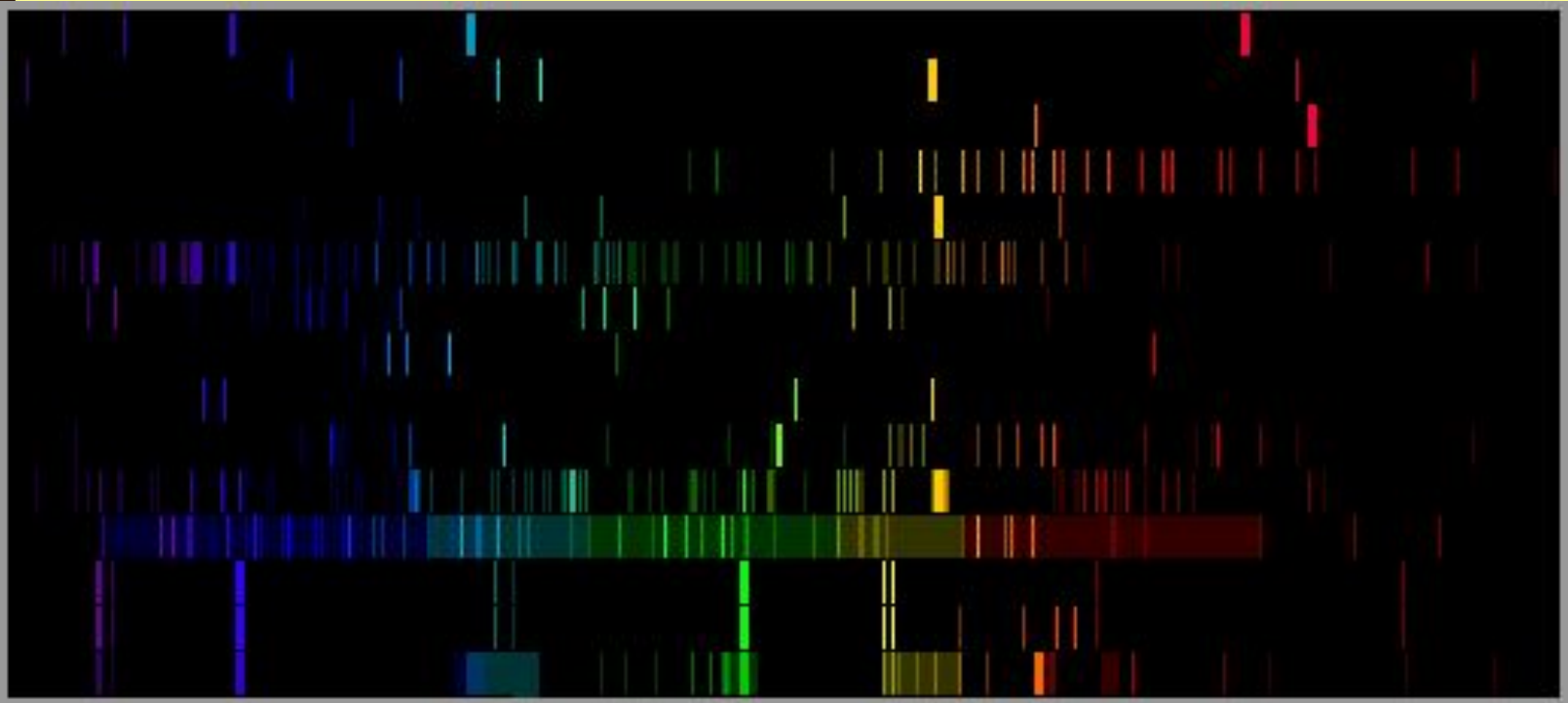
Emission Spectra

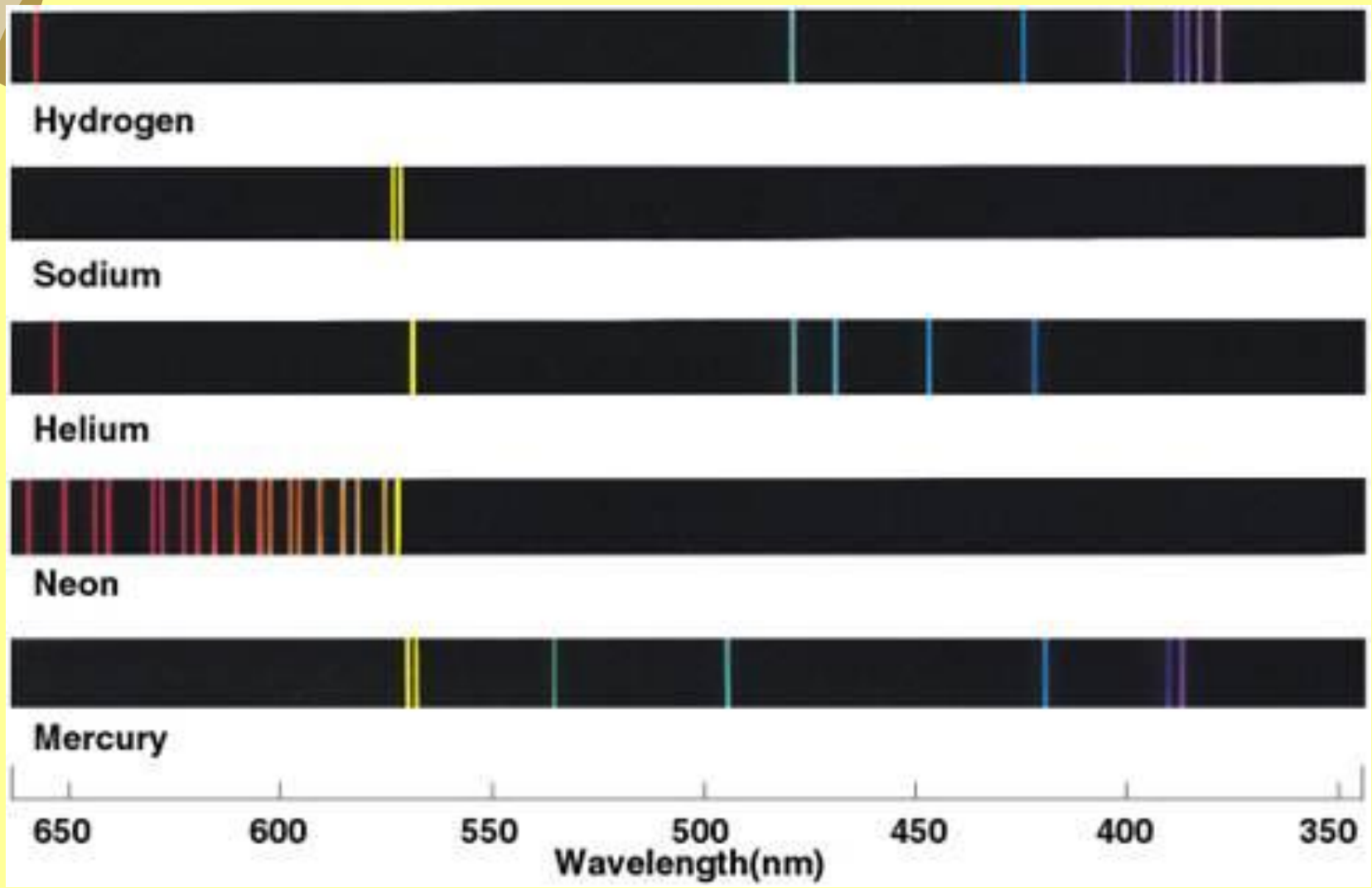


Electromagnetic Spectrum



Bright Line Spectra




Hydrogen
Sodium
Helium
Neon
Mercury
650
600
550
500
450
400
350
Wavelength(nm)

Properties of Light

Electrons can act as particles or ***waves***

Light is a form of energy

Photoelectric effect: certain frequency of light causes electrons to be forced into a higher energy level

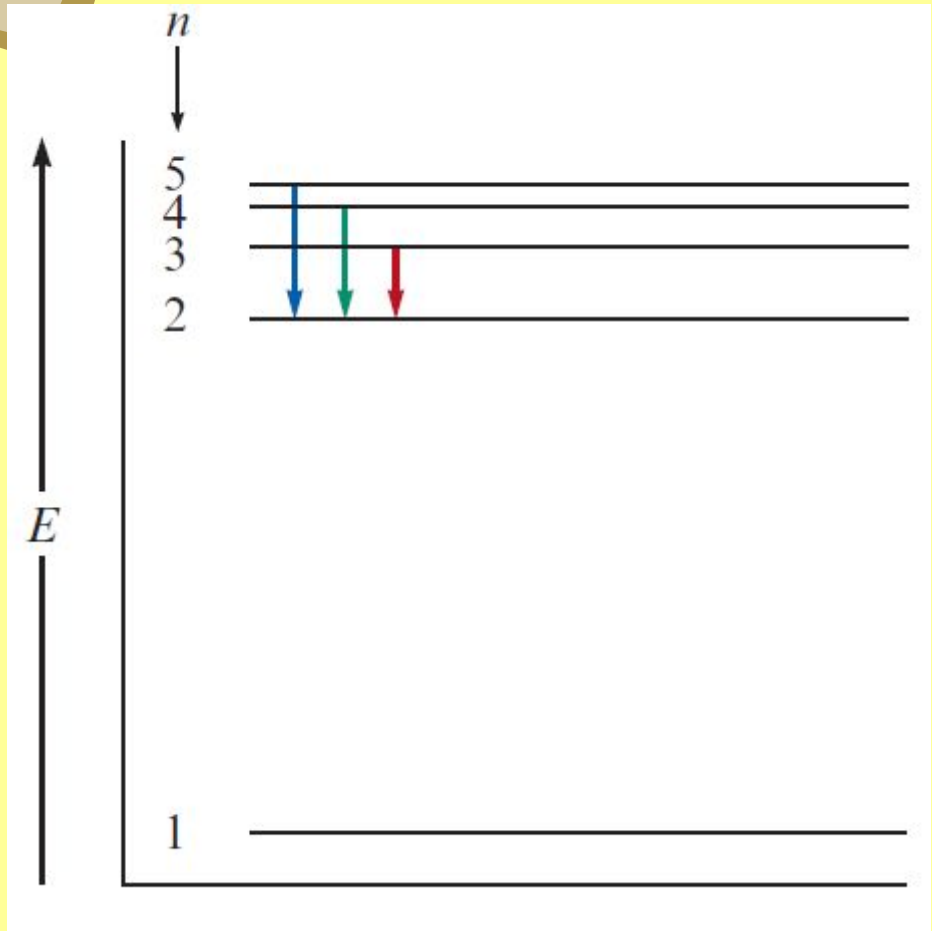
Light Emission

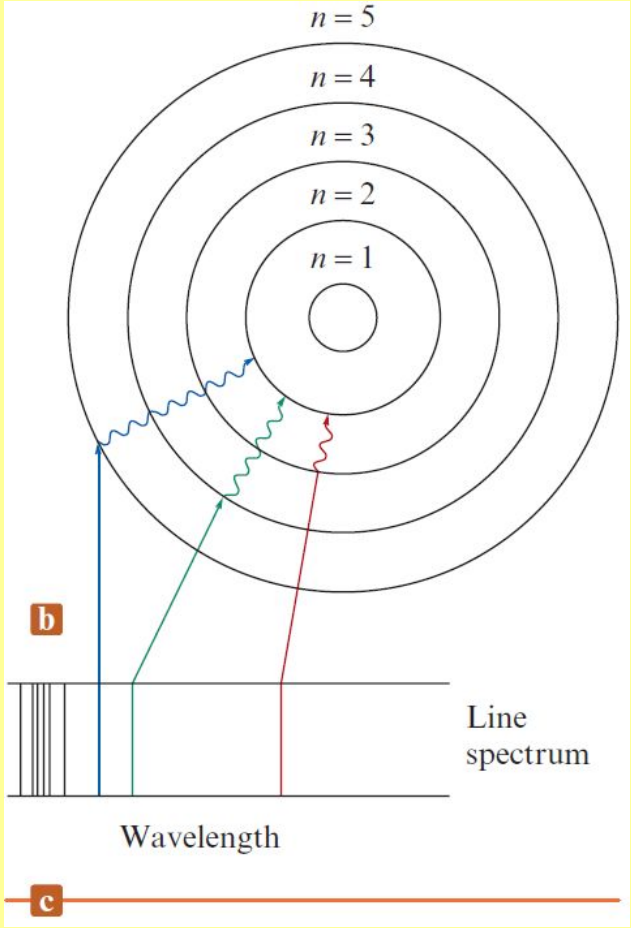
Law of Conservation

When electrons are "excited" by energy, they jump into higher energy levels.

When those same e^- fall back to the "ground" state, they emit certain wavelengths of light

https://www.youtube.com/watch?v=rLNM8zI4Q_M


n
5
4
3
2
1
E


n = 5
n = 4
n = 3
n = 2
n = 1
b
Line
spectrum
Wavelength
c

Colors of various gases

Quantization of Energy

Quantum is the minimum quantity of energy that can either be lost or gained by an atom.

Calculated using the frequency of light and a constant developed by Max Planck

https://www.youtube.com/watch?v=LgYMxH1LCdo

Honors Only: Relationship between Wavelength and Frequency

$$\lambda \nu = c$$

- λ - Wavelength in meters
- ν - Frequency in cycles per second
- c - Speed of light (2.9979×10^8 m/s)

Honors Only: Practice Problem

- The brilliant red colors seen in fireworks are due to the emission of light with wavelengths around 650 nm when strontium salts are heated
  - Calculate the frequency of red light of wavelength 6.50×10^2 nm

Honors Only: Energy of Photons

$E=h\nu$

E = energy of a photon

h = 6.626x10-34 J*s

ν = frequency (s^{-1})

Practice: Calculate the energy of the photon in the previous example. What is the relationship between energy and wavelength of light? Frequency of light?