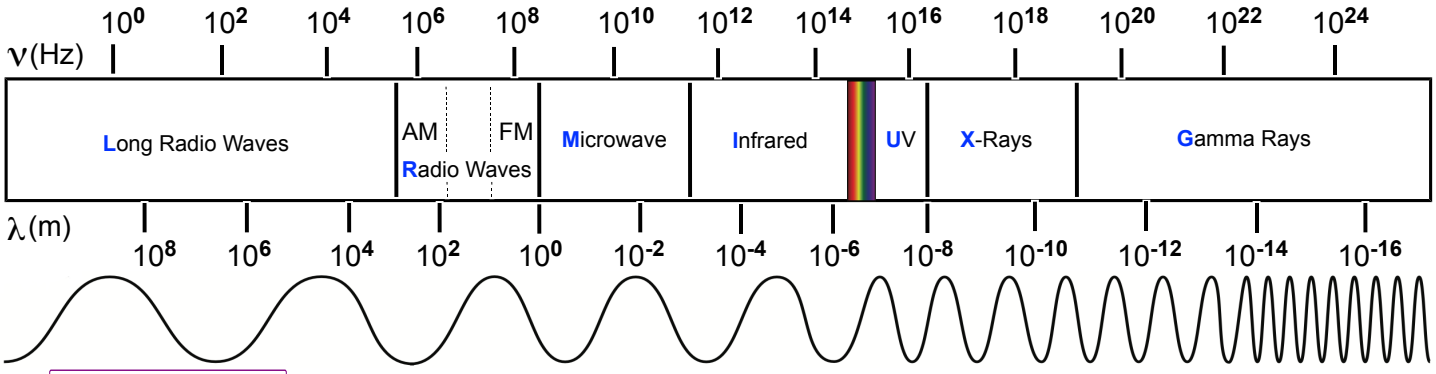
CONCEPT: ELECTROMAGNETIC SPECTRUM (SIMPLIFIED)

- **The Electromagnetic Spectrum** is a continuum of *electromagnetic radiation* containing all wavelengths and frequencies.
  - □ **Electromagnetic Radiation**: flow of _____ at the speed of light through space as electric or magnetic fields.
  - □ Physicists Max Planck and Albert Einstein theorized this radiation was made of "packets or particles".
    - This light "particle" or "packet" was referred to as a _____ (quantum).
  - □ As we move from radio waves to gamma rays, the wavelengths _____ and frequencies _____.



MEMORY TOOL

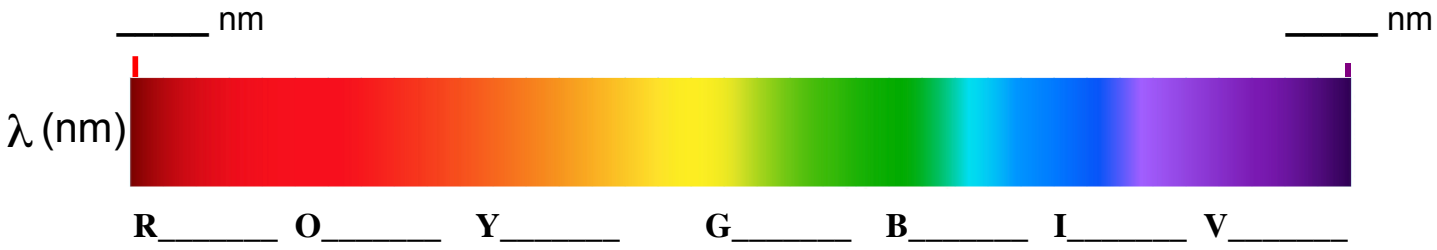
Large **R**ude **M**artians **I**nvented **V**ery **U**nusual **X-Ray** **G**uns

EXAMPLE: Which kind of electromagnetic radiation contains the greatest amount of energy per atom?

a) Microwave b) X-Ray c) Radio Waves d) Ultraviolet e) Infrared

Visible Light Spectrum

- Represents the small portion of the continuum that we can see without the aid of instruments.



PRACTICE: Which of the following sources of electromagnetic radiation will have the highest energy?

a) Light A (595 nm) b) Light B (0.0303 cm) c) Light C (0.000510 m) d) Light D (291 μm)

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PRACTICE: A carbon–oxygen double bond within a sugar molecule absorbs electromagnetic radiation at a frequency of $6.0 \times 10^{12}\ s^{-1}$. What portion of the electromagnetic spectrum does this represent?

a) Radio Waves b) Microwave c) Infrared d) Green Light e) Gamma Ray

PRACTICE: X-Ray detectors are devices that use scintillators to convert X-rays into light in order to detect X-Rays indirectly. Which of the following would be picked up by an X-Ray detector: radiation with a wavelength of 0.85 nm or a frequency of $6.52 \times 10^{11}\ s^{-1}$?