

Section 1: The Development of the New Atomic Model

The Rutherford model of the atom did not explain the location of electrons within the space surrounding the nucleus

*Properties of Light*

It was discovered that light has particle, as well as wave, like properties

*The wave Description of Light*

Electromagnetic Radiation: A form of energy that exhibits wavelike behavior as it travels through space

- Types of Electromagnetic Radiation:
  - o X-Rays
  - o Ultraviolet Light
  - o Infrared Light
  - o Microwaves
  - o Radio Waves

Electromagnetic Spectrum: This forms when all the forms of electromagnetic radiation fit together

All electromagnetic radiation moves at a constant speed of  $3.0 \times 10^8$  meters/second—This is also light's approximate speed through air

The significant feature of wave motion is its repetitive nature

- Wavelength: Expressed as  $\lambda$ , is the distance between corresponding points on adjacent waves and is measured in: meter, nanometer, centimeter
  - o  $1\text{nm} = 1 \times 10^{-9}\text{m}$
  
- Frequency: Expressed as  $\nu$ , is the number of waves that pass a given point in a specific time and is measured in Hertz, Hz

Wavelength and Frequency are mathematically related:

- $C = \lambda\nu$ 
  - o C being the speed of light,  $\lambda$  the wavelength, and  $\nu$  the frequency

*The photoelectric Effect*

Photoelectric Effect: The emission of electrons from a metal when a light shines on the metal

The Mystery: Why does light striking metal use a minimum frequency?