

## Wavelength : Visibility : Temperature

The relationship among wavelength, visibility, and temperature is based on an understanding of the electromagnetic spectrum. The various types of electromagnetic energy are organized categorically by photons of a specific wavelength. The range of this spectrum spans from the largest wavelength, on an order of magnitude of  $10^3$  meters, to the smallest wavelength, on an order of magnitude of  $10^{-12}$  meters. Also directly related to wavelength is frequency: the larger the wavelength, the lower the frequency in Hz.<sup>1</sup> Shorter wavelengths are more efficient at penetrating matter.

Temperature is function of energy emitted, and is related to wavelength directly: radiation types emitted on the order of magnitude  $>10^5$  eV (electron volts) are the hottest (and appear bluer to the human eye), whereas radiation types emitted on the order of magnitude  $<10^{-5}$  eV are the coldest (and appear redder to the human eye), respectively.<sup>2</sup>

Light visible to humans is categorized by a small portion of the electromagnetic spectrum between wavelengths of 380 – 740 nm ( $10^{-9}$ m) and frequencies of 430-770 THz—which corresponds to 800°C (1,472°F) as a wavelength becomes infrared, and in excess of 12,000°C (21,000°F) as a wavelength enters the UV. The human eye is most sensitive to UV light in the lower bands between 265-275 nm.

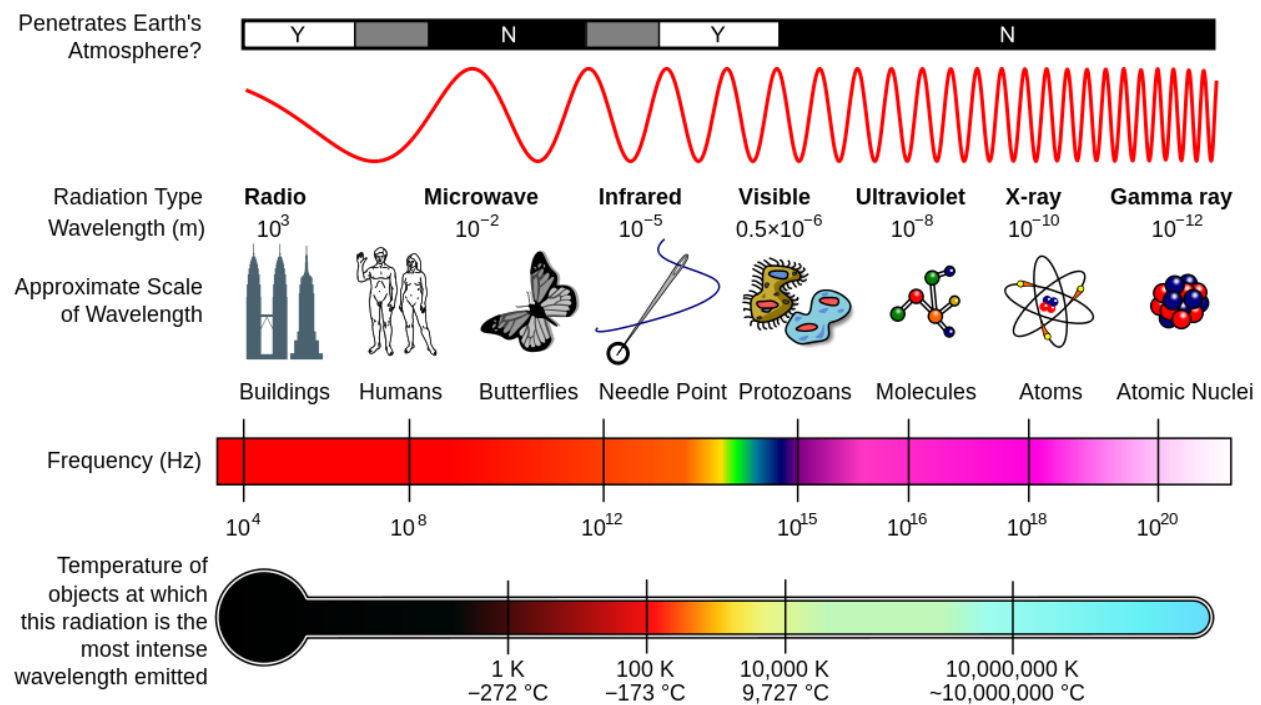


Figure 1 [http://www.sun.org/uploads/images/Spectrum\\_of\\_electromagnetic\\_radiation.png](http://www.sun.org/uploads/images/Spectrum_of_electromagnetic_radiation.png)

<sup>1</sup> <http://www.sun.org/encyclopedia/electromagnetic-spectrum>

<sup>2</sup> <http://csep10.phys.utk.edu/astr162/lect/light/spectrum.html>