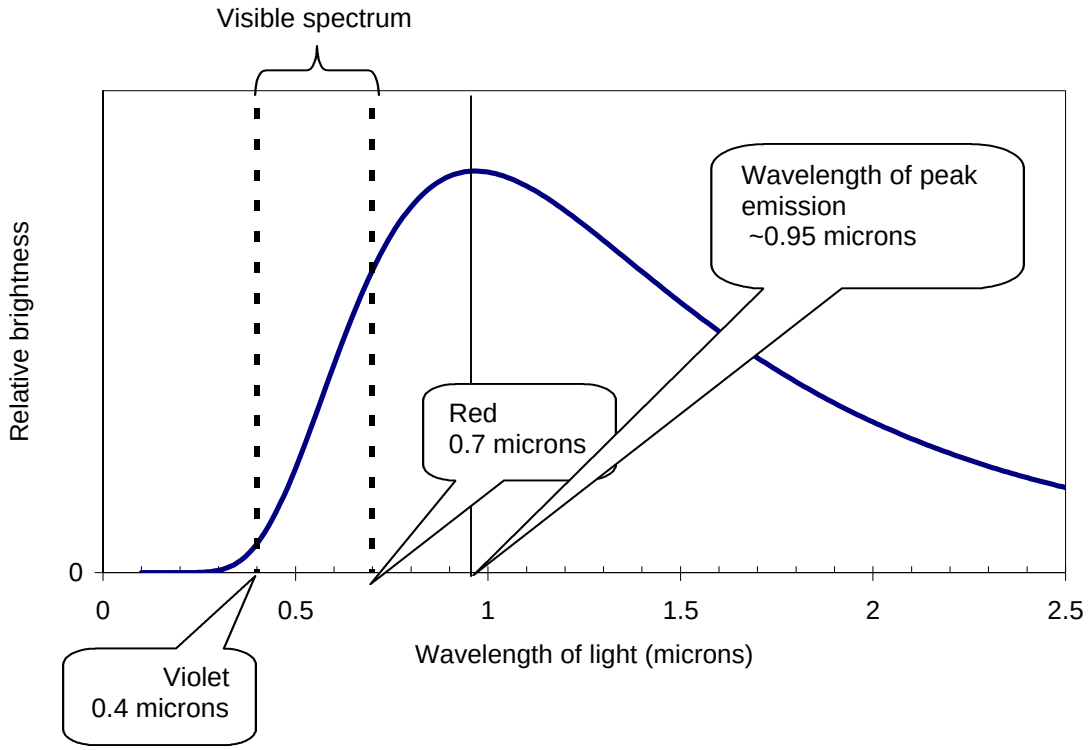
Indoor Lighting

The following is the spectrum of light given off by an incandescent bulb. Its peak emission occurs in the infra red, at about 0.95 microns. This light would be somewhat orange, since it is brightest in the red, and it is brighter in the green than in the blue.



Wien's law gives the relationship between the temperature of a black body and the light it emits:

$$l_{peak} = \frac{2.9\text{mmK}}{\text{T}} \Rightarrow \text{T} = \frac{2.9\text{mmK}}{l_{peak}}$$

We can use this formula to calculate the temperature of the filament in the bulb:

$$\text{T} = \frac{2.9\text{mmK}}{0.95\text{microns}} \times \frac{1000\text{microns}}{1\text{mm}} = 3053\text{K}$$

We can also use Wien's law to calculate the wavelength at which the sun's light emission peaks, given that the sun is 5770K:

$$l_{peak} = \frac{2.9\text{mmK}}{5770\text{K}} \times \frac{1000\text{microns}}{1\text{mm}} = 0.503\text{microns}$$

A wavelength of approximately half a micron fits right in the middle of the spectrum of visible light, so that the sun's light would have a more uniform distribution of visible wavelengths and would therefore be considerably whiter than that of the bulb.