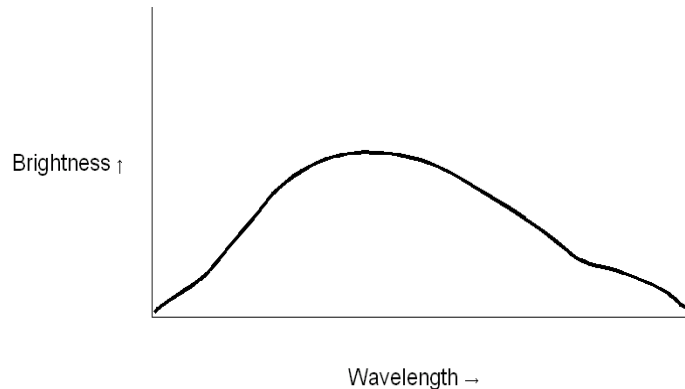


# Thermal Radiation

1. Any object not at absolute zero emits light.
2. The hotter the object, the shorter the  $\lambda$  of light we see.
3. Temperature is inversely proportional to  $\lambda$
4. As energy increases, brightness increases and more photons of wavelengths are made. The curve is not symmetric and is skewed to the right.



5. Wier's Law states that  $\lambda_{\text{max}} = 0.0029 / \text{temperature (Kelvin)}$ .
6. A red star would be colder than our sun because it is red, therefore, a longer wavelength.
7. Total luminosity increases as temperature goes up, which means the curve shifts upward and to the left.
8. Luminosity is the amount of energy per second cast in all directions.
9. Luminosity is not the same as brightness. Brightness is the energy in our direction, and luminosity is the energy cast in all directions.
10.  $L$  is proportional to  $T^4$
11. A small change in temperature means a big luminosity change, known as Stefan's Law.
12. Brightness is proportional to luminosity / distance<sup>2</sup>.

# Doppler Shift

1. Doppler shift is a shift in observed wavelength of light due to relative motion of observer and source of light.
2. Moving towards the source of light means higher frequency, smaller  $\lambda$ ; moving away from source of light means lower frequency, longer  $\lambda$ .
3. Moving towards is called blue shifting, moving away is called red shifting.
4. Looking perpendicular to trajectory of the light causes no doppler shift.
5. Only measures radial motion, not transverse motion.