

Blackbody Radiation - Exercise

Student Name: _____

Step 1.

Using Figures 2 through 8, estimate and mark the maximum luminosity on each graph.

Step 2.

Using a small ruler, or other straight edge, draw a vertical line from the maximum value straight down to the X-axis for each graph. Estimate the wavelength on the X-axis (this will be λ_{max}) and record the values for each graph in Table 2.

Step 3.

Using Equation 1 (below), calculate the surface temperature of each star and record the answers in Table 2.

Step 1.

Using Figure 9, interpolate/estimate the Spectral Type of each star from the surface temperature for each star. Record your estimated spectral type in Table 2 for each star.

Remember: For Spectral Type, the letters, O B A F G K M (Oh Be A Fine Girl [or Guy] Kiss Me), with each subdivided into 10 minor divisions (e.g. F0, F1, F2 ... F9, G0, etc.).

Step 5.

Open Stellarium and set the Landscape and Atmosphere to off. Use the Search tool to find each of the stars in Figures 2 through 8 and record the first two characters of the Spectral Type (shown in the upper left information block on the screen for each star) in Table 2.

Star Name	λ_{max} (nm)	Surface Temp. (K)	Estimated Spectral Type	Stellarium Spectral Type
Alnitak				
lambda Taurus				
Betelgeuse				
Aldebaran				
gamma Taurus				
theta Taurus				
Arneb				

Table 2.

- **Question 1:** Do your estimates of Spectral Type match those listed in Stellarium. Explain any that are different by a wide margin.

$$\lambda_{\text{max}} = [2.898 \times 10^6 \text{ nm.K}] / T \quad \text{Eq. 1.}$$

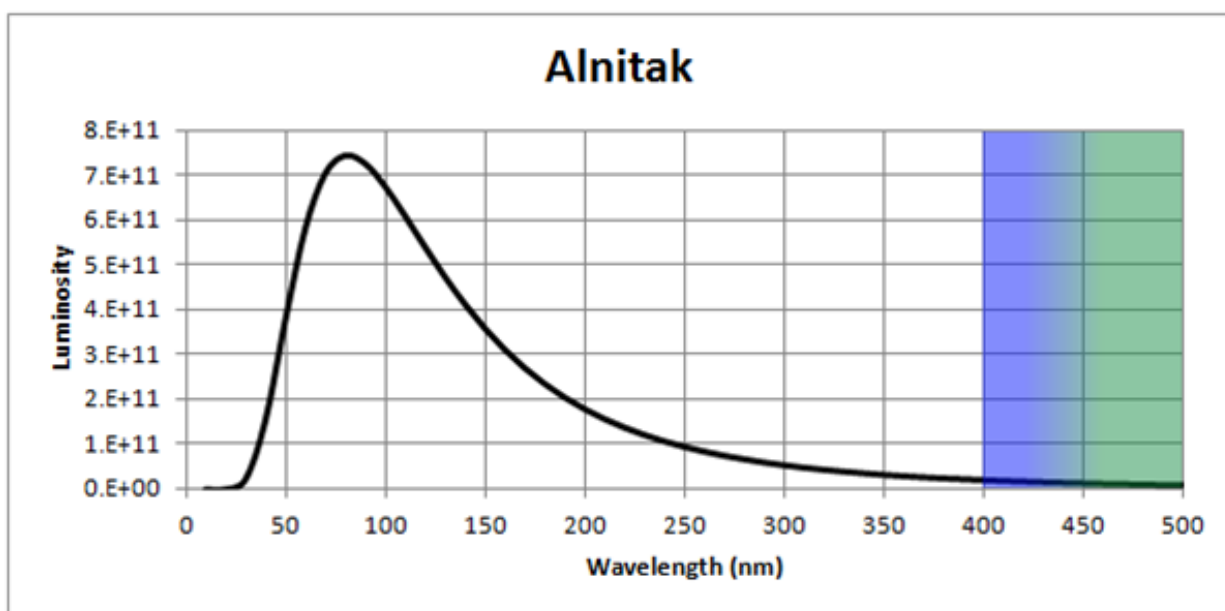


Figure 2.

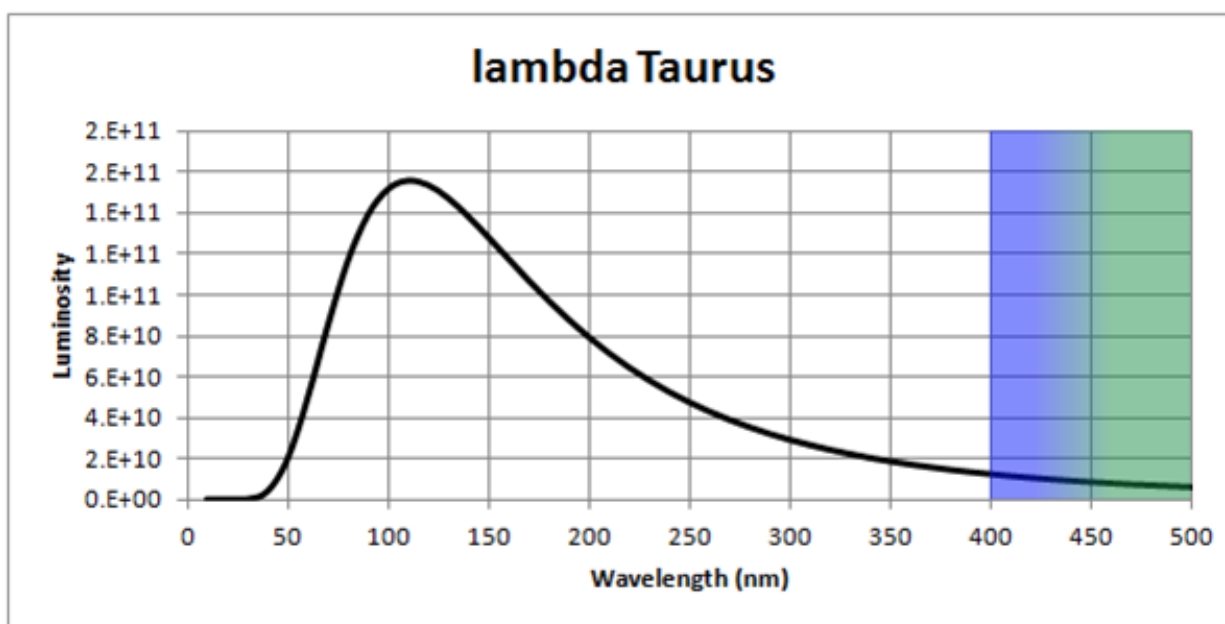


Figure 3.

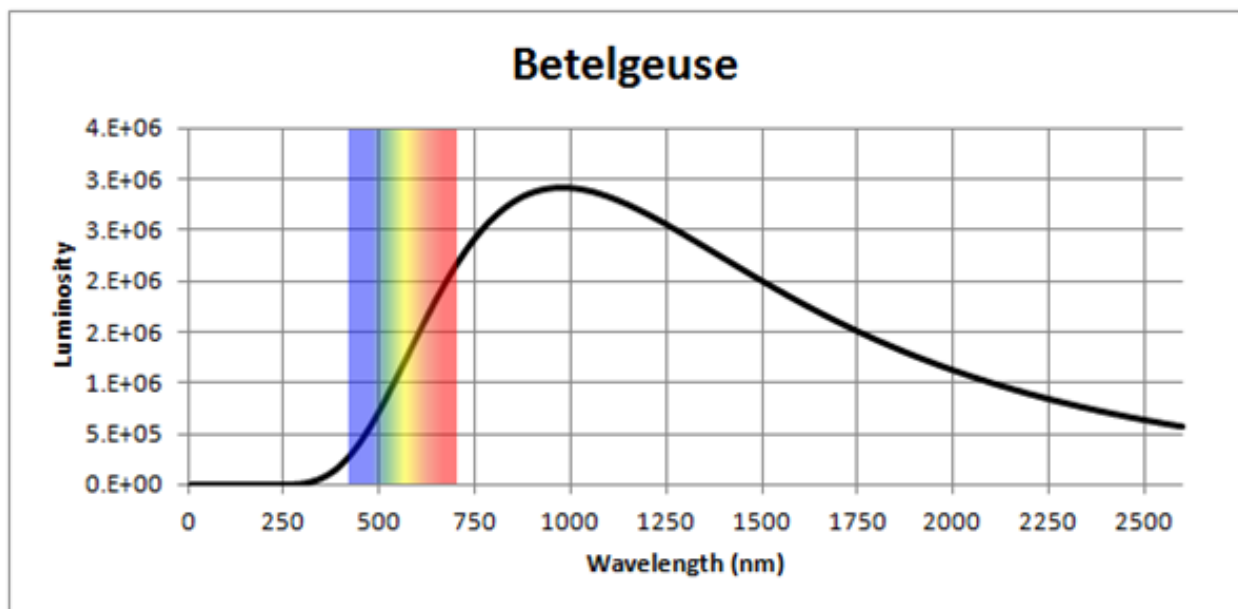


Figure 4.

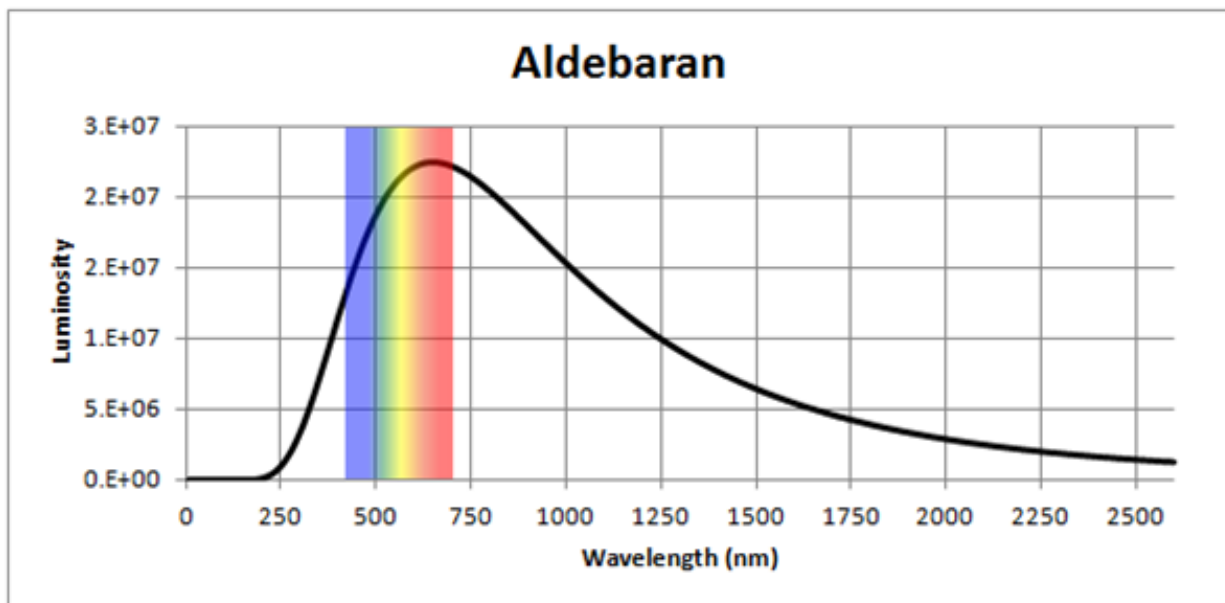


Figure 5.

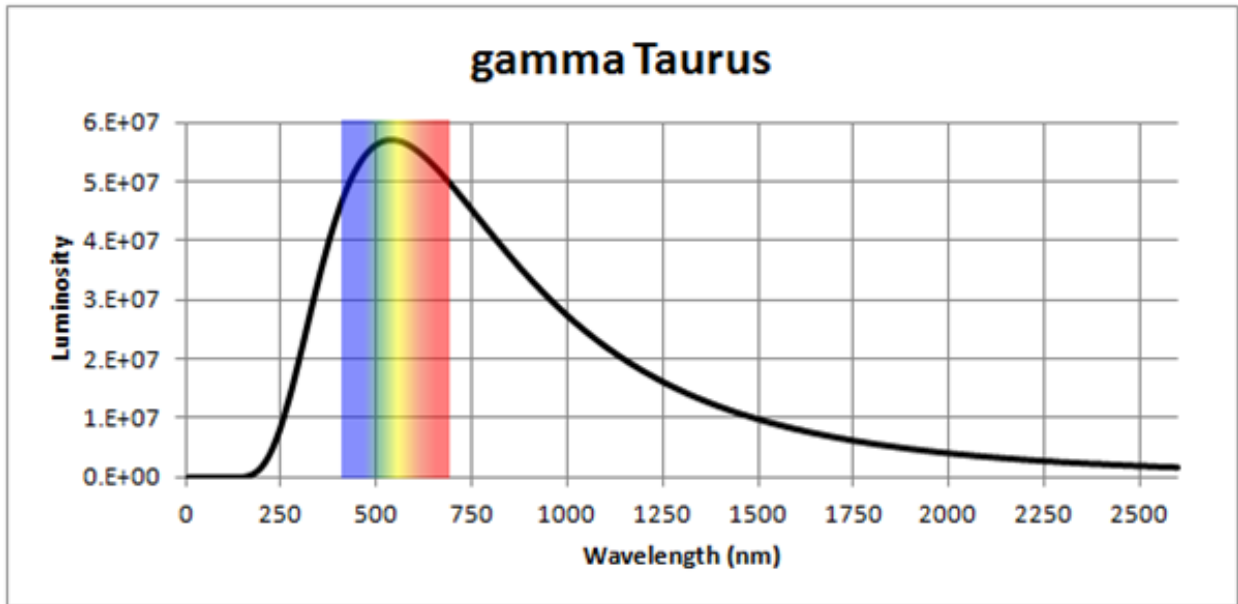


Figure 6.

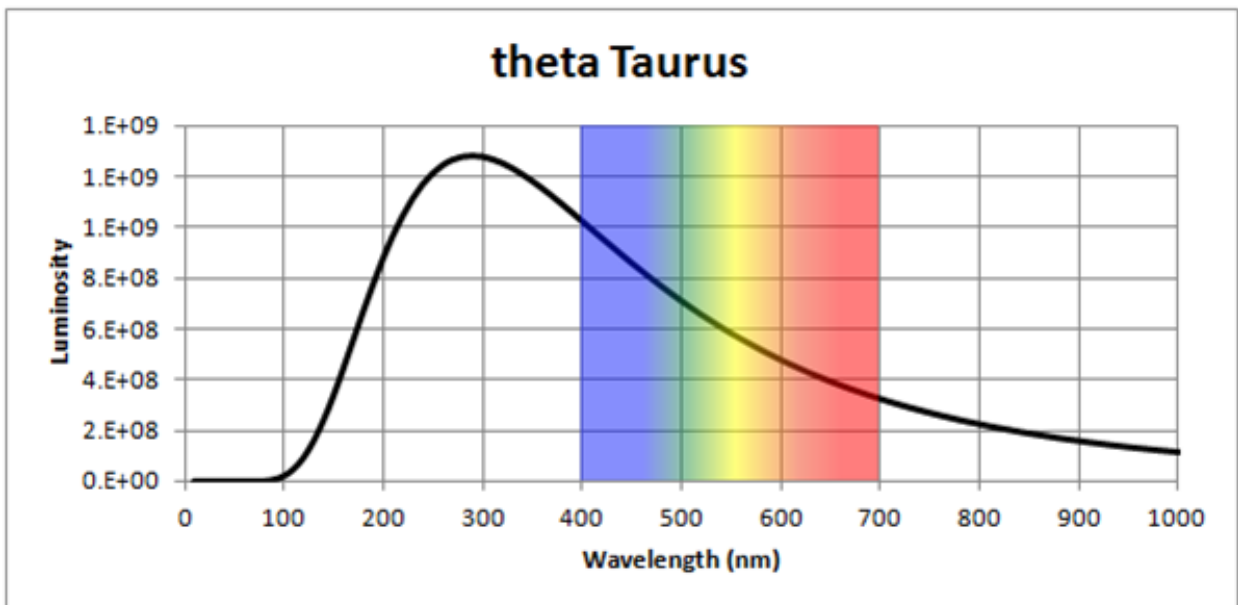


Figure 7.

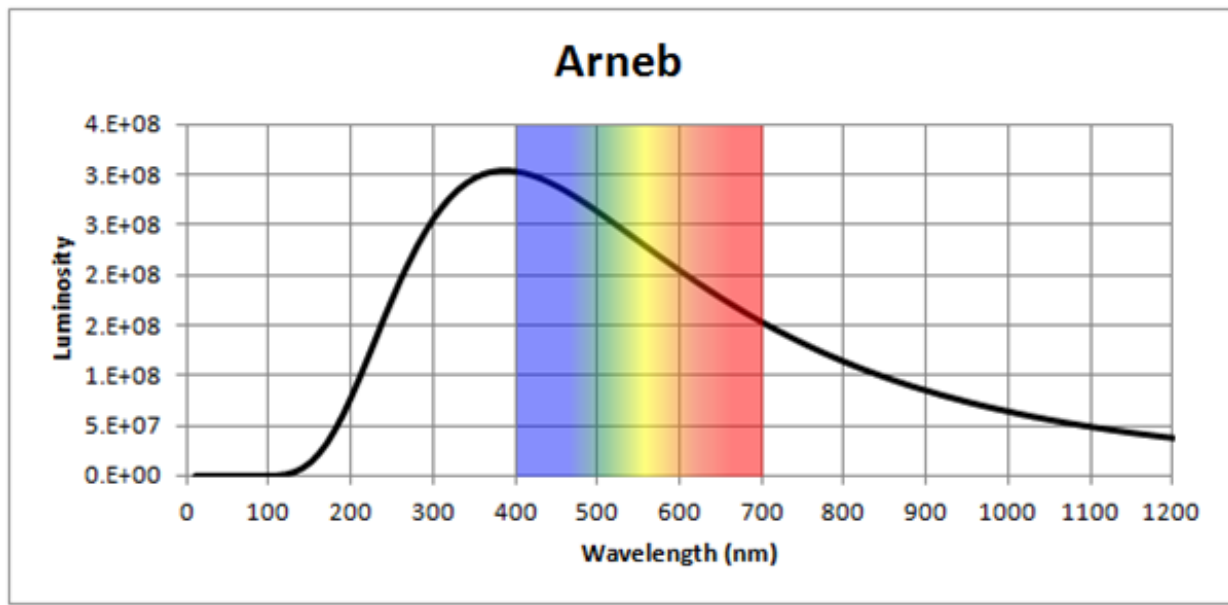


Figure 8.

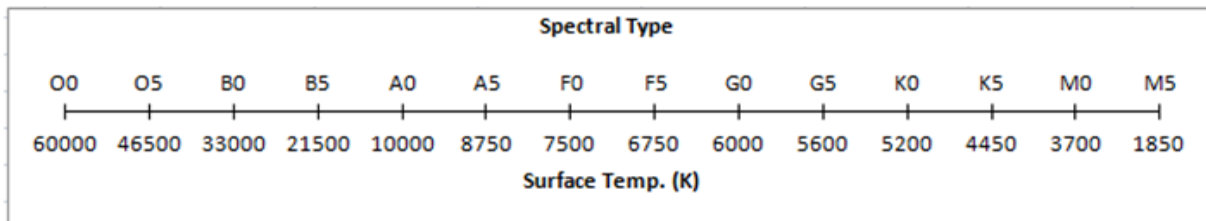


Figure 9.