

Physics Worksheets for Mr. Harris' Absence

W M

May 2025

1 Wien's Law Worksheet

2 WL WS A: Blackbody Spectrum

1. Select a temperature and write down the colour seen on the star. What type of relationship is there between a star colour and its temperature?

As a star's temperature increases, its blue hue increases while the red hue decreases and vice versa.

2. How does the temperature of a star relate to the intensity of radiation? How is this seen on the graph?

As the temperature of a star increases, the intensity of the radiation increases. This is denoted on the graph through a larger area under the graph signified by a bigger slope.

Why does a Sirius A looks blue if it emits light of all wavelengths? Use the graph to support your answer.

The graph emits a maximum intensity / spectral power density lies on the blue wavelength, such that it overpowers all other wavelengths. This is evidenced by the proximity of the blue peak to the maximum of the graph.

Why does a light bulb looks red if it emits light of all wavelengths? Use the graph to support your answer.

The wavelength of the maximum emitted intensity radiation lies towards the red visible light frequency.

Why does a star colour at the temperature of the Sun looks white?

The star emits wavelengths of light within the visible light spectrum of similar intensities. This causes them to combine and appear in our eyes as white light.

Wavelength (m*10⁻⁶) vs. Temperature (K)

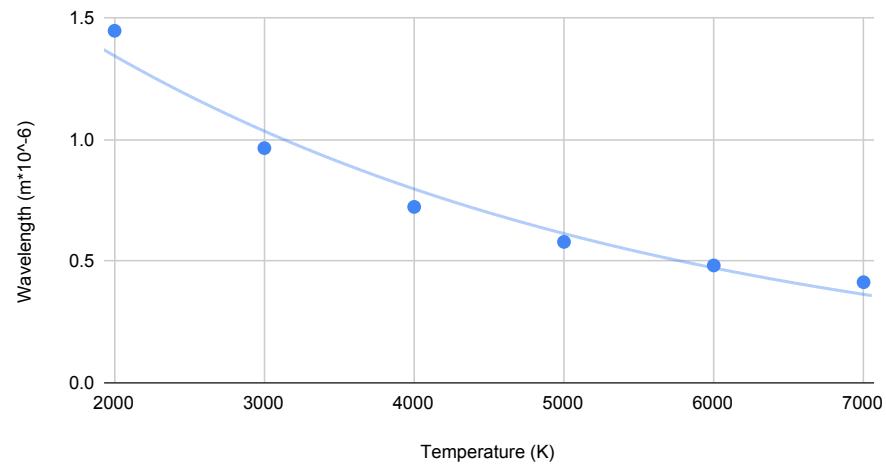


Figure 1: Enter Caption

3 WL WS B: Wien's Law

Temperature (K)	Wavelength(λ)($m * 10^{-6}$)
7000	0.414
6000	0.483
5000	0.580
4000	0.724
3000	0.966
2000	1.449

The figure below displays an inversely proportional relationship, such that:

$$T \propto \frac{1}{\lambda} \quad (1)$$

Since you have spotted the type of relationship, use the third column of the table to find the constant of proportionality. Write the mean value and its units:

Temperature (K)	Wavelength(λ)($m * 10^{-6}$)	b (μK)
7000	0.414	2898
6000	0.483	2898
5000	0.580	2900
4000	0.724	2896
3000	0.966	2898
2000	1.449	2898
	AVERAGE	2898 μK