

Investigating the light from stars.

<https://goo.gl/7nvX3z>



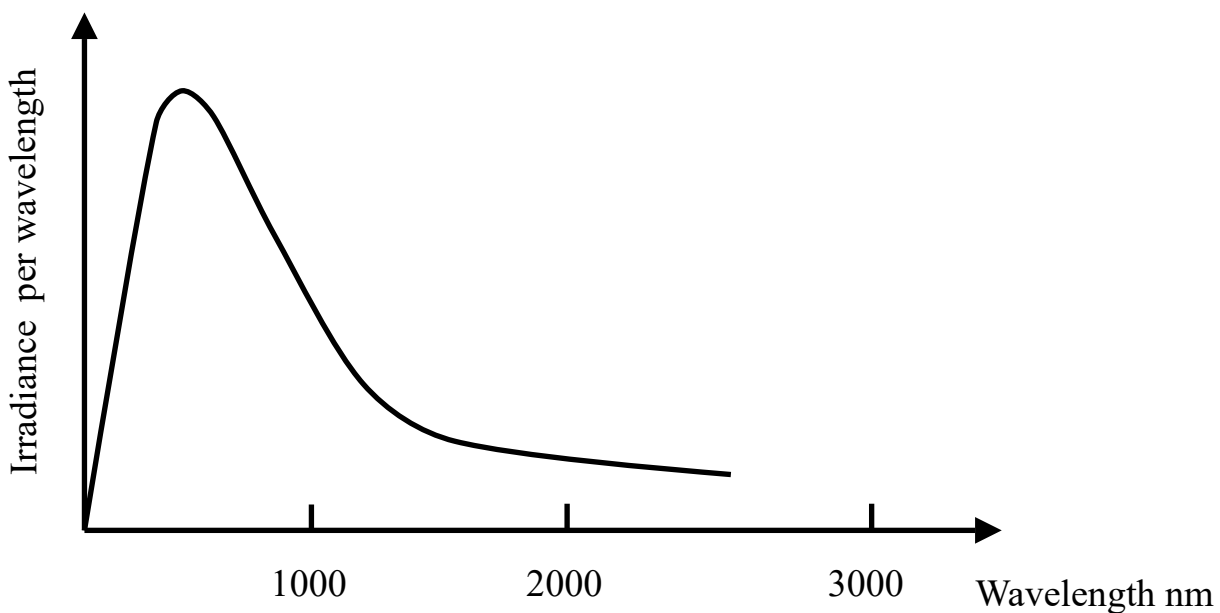
Win the night sky stars have different colours. Our star, The Sun is white. Other stars are blue and red.

The colour of a star can tell us if it is hot or cool. In other words the colour of a star can tell us its temperature.

Astrophysicists measure the amount of light at different wavelengths that come from stars.

Each wavelength of electromagnetic radiation contributes to the total energy emitted per second per unit area of the star.

The results are displayed in a graph of irradiance against wavelength.



Black Body Curve

This graph is famous. It has been studied since the mid nineteenth century.

It is called a black body curve.

A black body is an object that is a perfect absorber of energy and a perfect emitter of energy too.

The closest earth object like a black body is an oven which has a tiny hole in it to emit its radiation. Stars behave as black body objects.

Exploring black body curves.

Using the PhET simulations on black body curve we can find out about how the colour of a star depends on its temperature.



<https://goo.gl/7Pf>



Set the temperature of the object to the temperature of the Sun.

Temperature in kelvin =

Peak wavelength in nm =

Irradiance in $W m^{-2}$ /wavelength =

Colour



Now set the temperature to a cooler star, say 3900 K

Temperature in kelvin =

Peak wavelength in nm =

Irradiance in $W m^{-2}$ /wavelength =

Colour



Now set the temperature to a hotter star, say 7000 K

Temperature in kelvin =

Peak wavelength in nm =

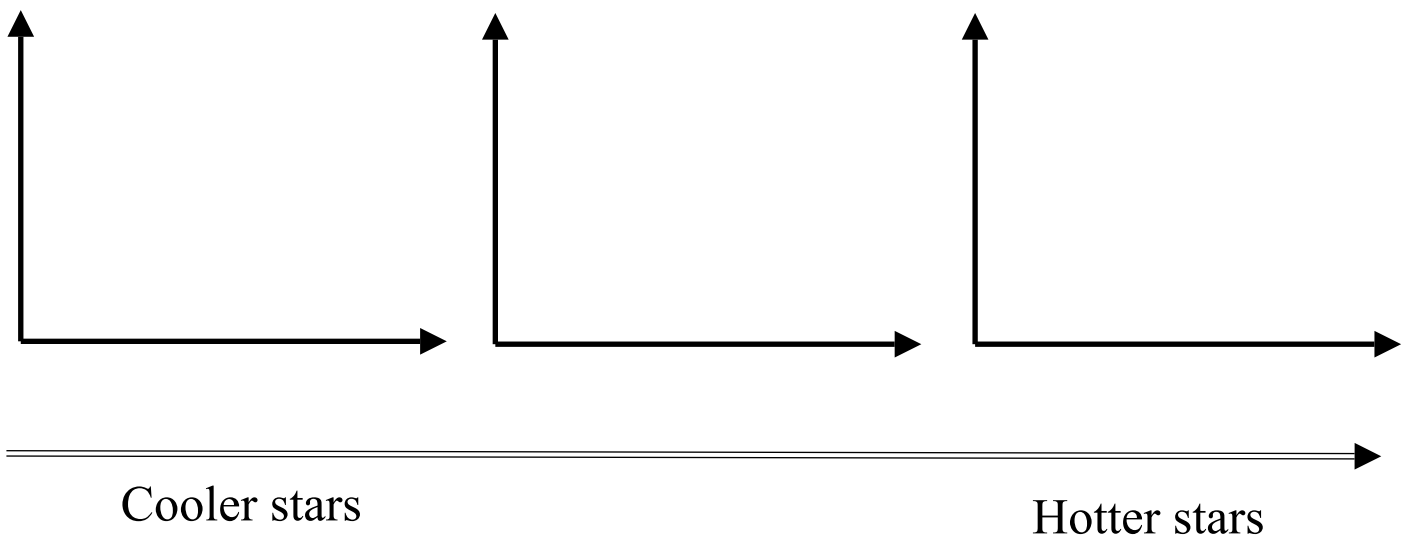
Irradiance in $W m^{-2}$ /wavelength =

Colour

Conclusions on star colour

As the star`s temperature increases the star`s irradiance _____

As the star`s temperature increases the peak wavelength of the emitted radiation moves towards the _____ wavelength end of the electromagnetic spectrum, thus hot stars are _____ coloured and cool stars are _____ colour.



Wein`s law

Not in higher

Record the peak wavelength emitted by a hot body for different wavelengths.

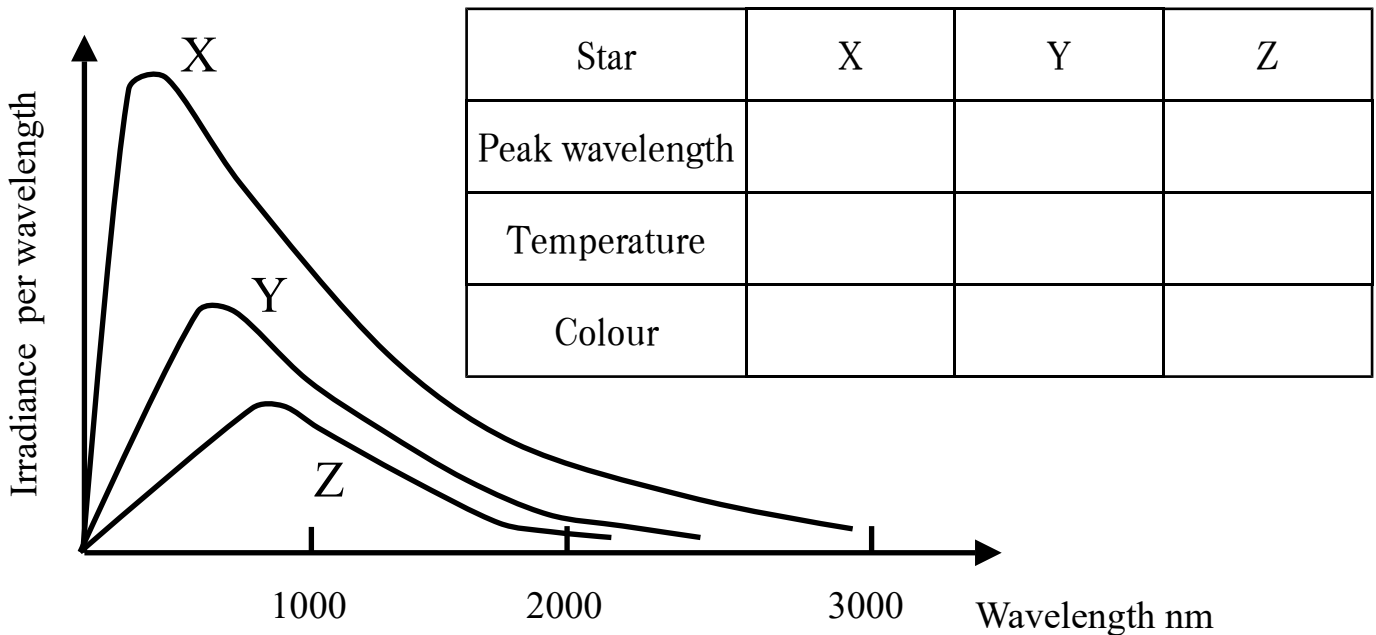
Record your values in the table across and see if you can find a relationship.

Temperature K	Peak wavelength nm

Star Classification

Just by examining the spectral output from a star its temperature can be determined from the maximum wavelength of light that it emits..

Star`s surface temperature can be used to categorise the star.



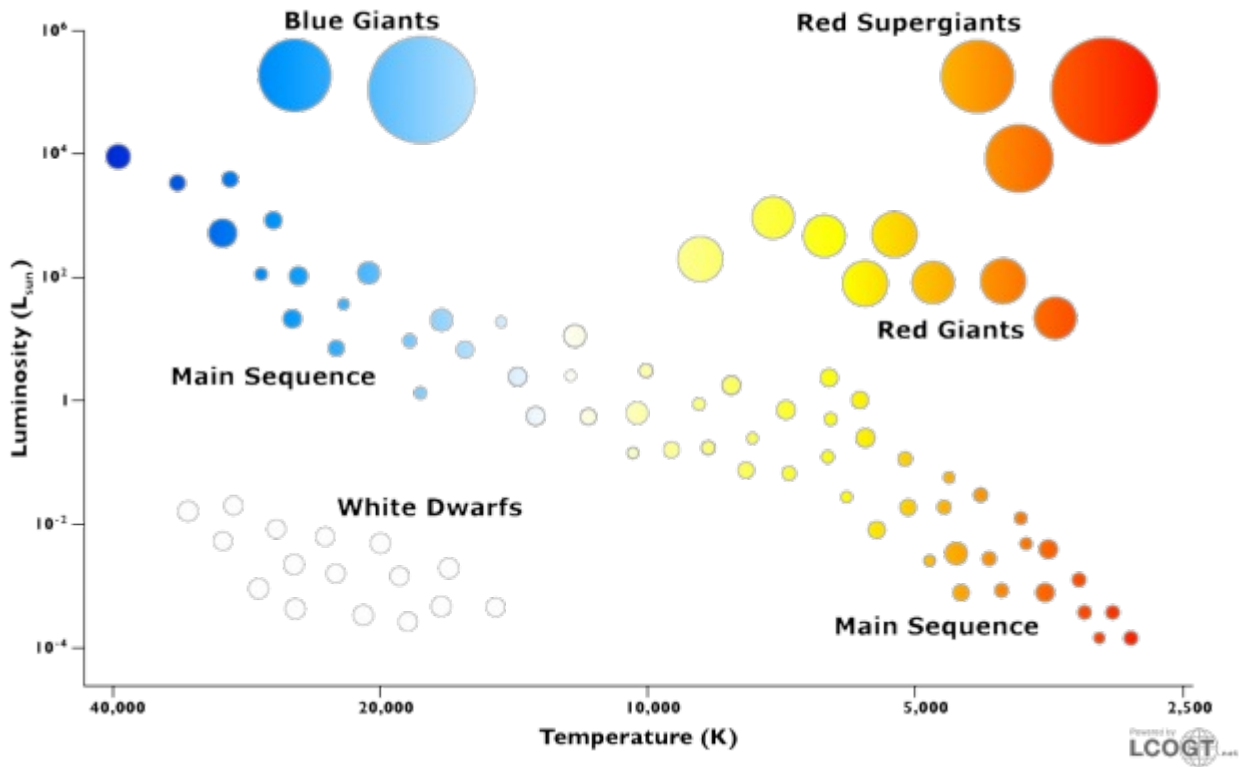
Harvard Spectral Classification

Spectral Type	Surface Temp / K	Colour
O	> 28000	Violet
B	10,000 - 28,000	Blue
A	7,500 - 10,000	Blue
F	6,000 - 7,500	Blue white
G	5,000 - 6000	White
K	3,000 - 5,000	Orange red
M	< 3,500	Red

The surface temperature of our Sun is 5,700 K so it is classed as a

Not in higher

Hertzsprung - Russell Diagram



<https://goo.gl/XWQOyv>