# Topic 3: The Spectroscope

# What are stars made of?

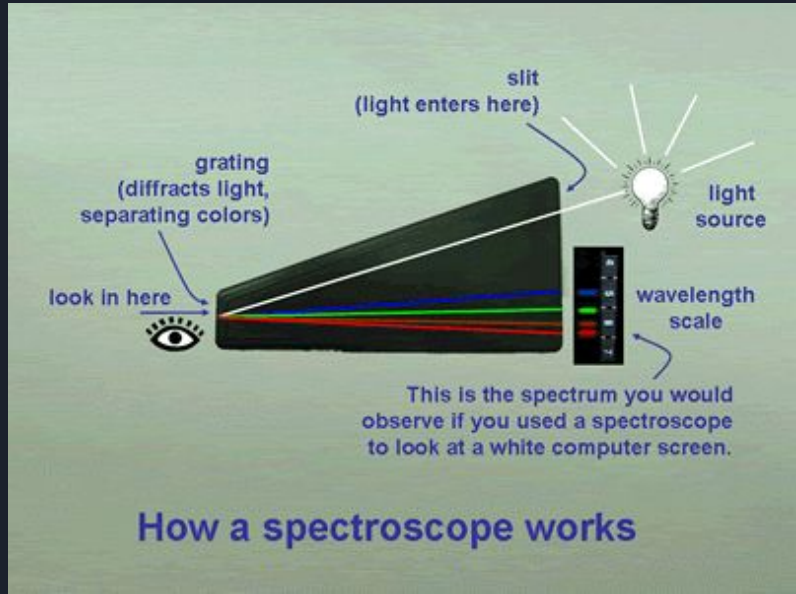
**-Isaac Newton passed a beam of sunlight through a prism.  When he did this, it produced a spectrum of colour**

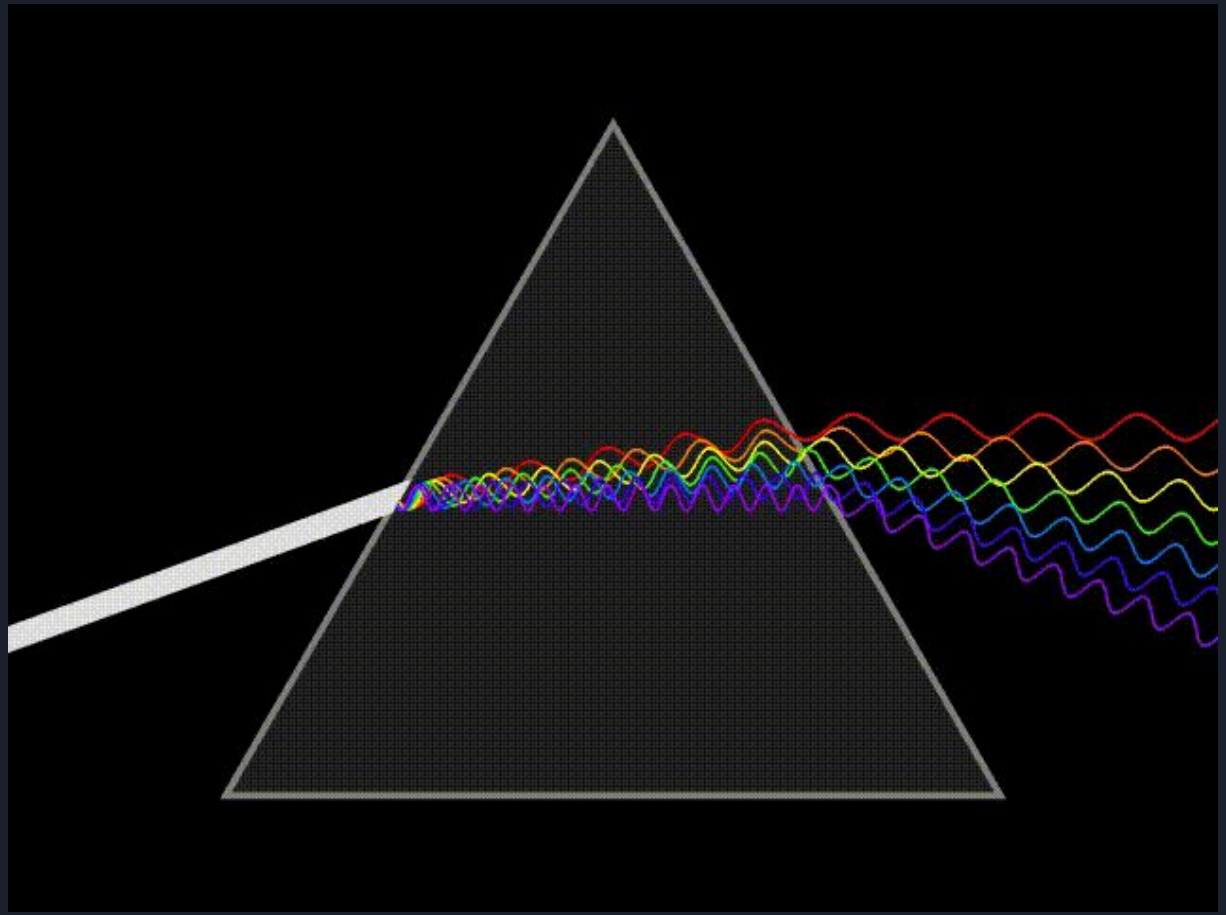
**-This experiment showed that white light is made up of many different colors**

# Spectroscopes

**-Using a spectroscope, astronomers noticed that different light sources created different light patterns**

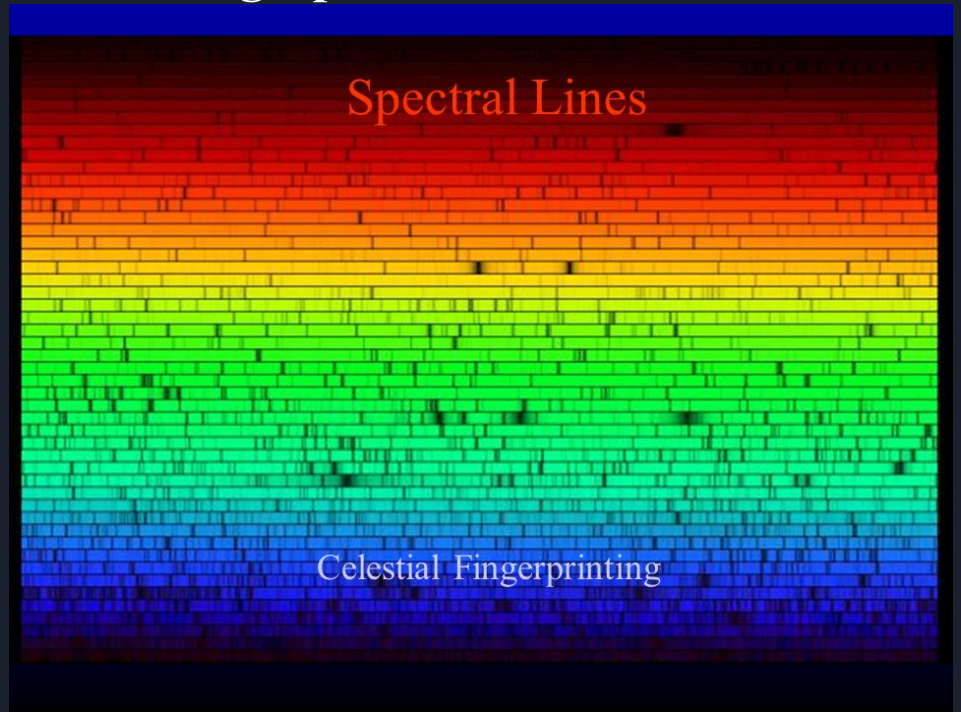
**-Spectroscope: A device that creates a detailed spectrum of light**





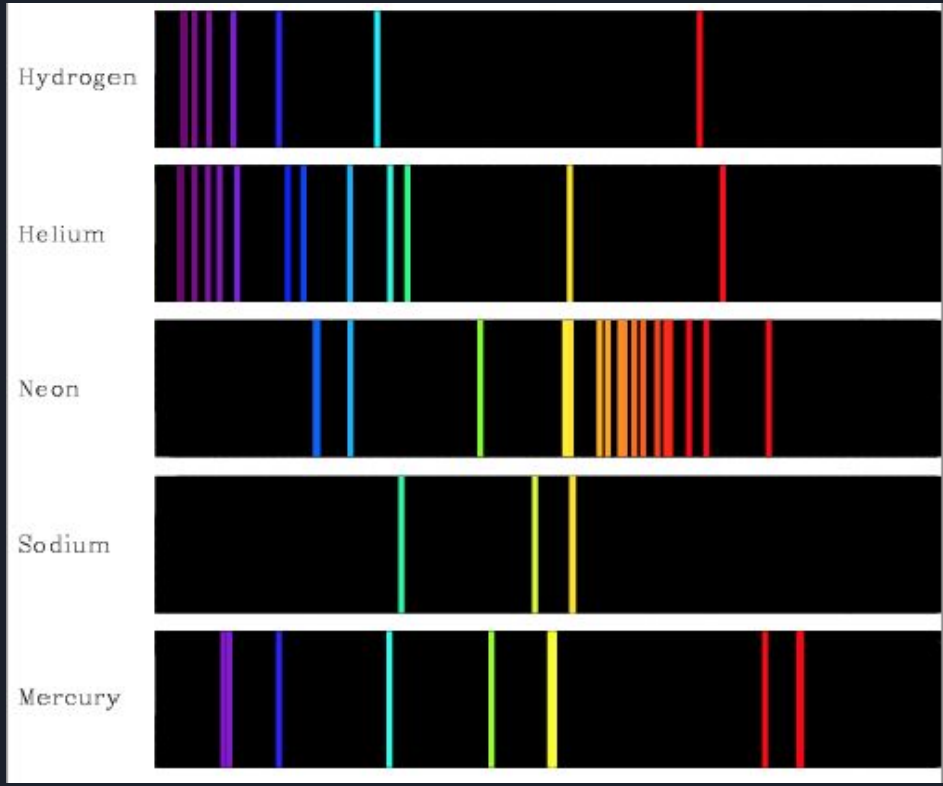
-Some stars created a spectrum which contained dark lines. These dark lines are called spectral lines

- This created a fingerprint or identification for each star

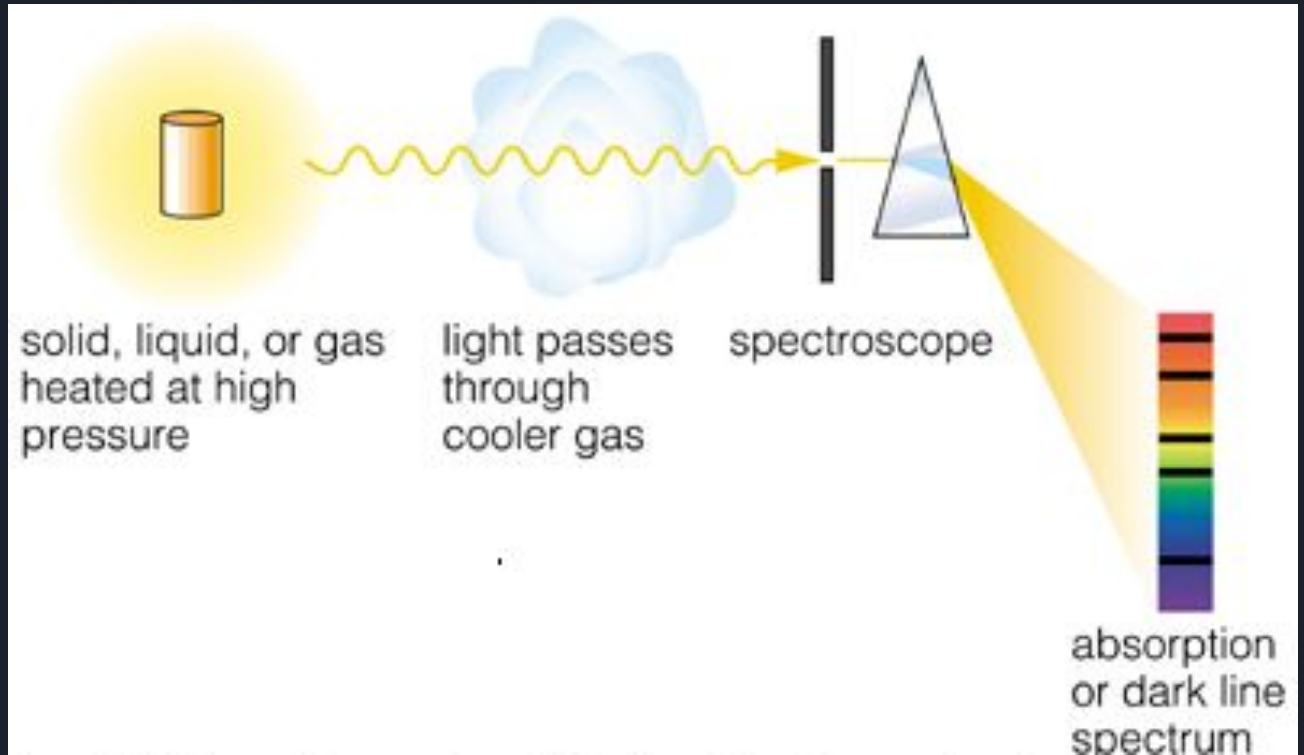


-Scientists heated different elements until they were hot enough to glow, and examined them through a spectroscope

-Each element that they studied had a unique set of spectral lines

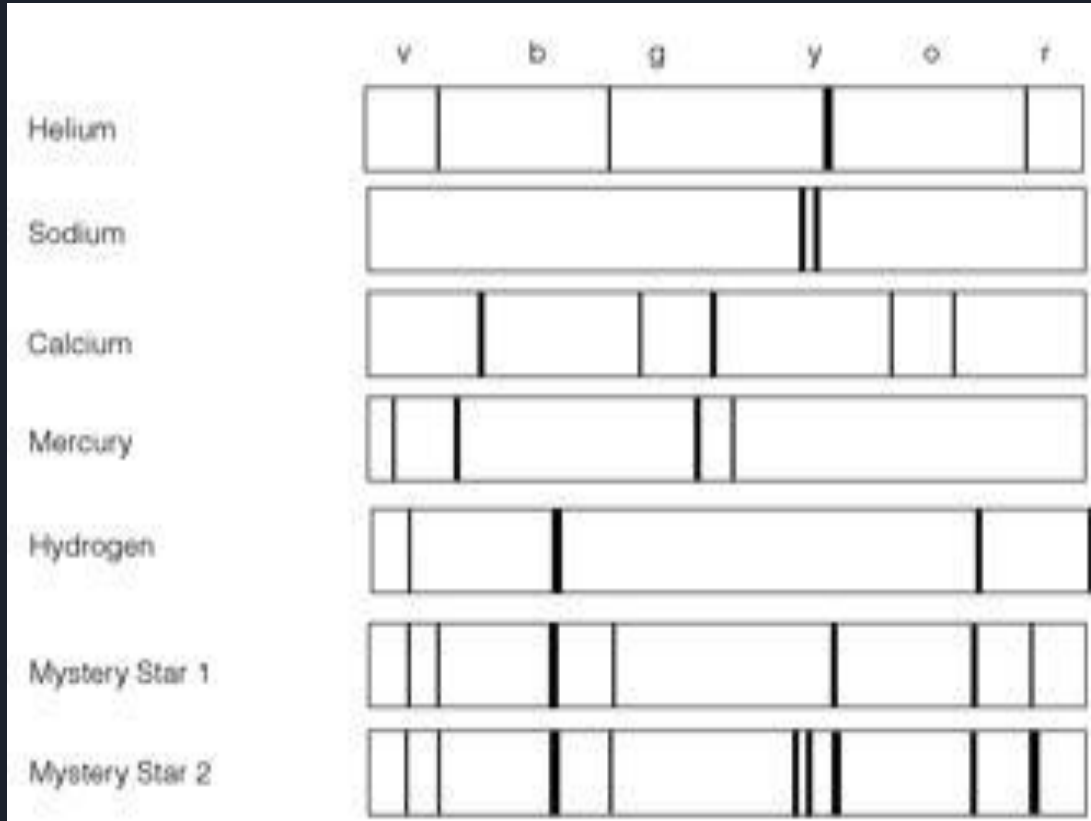


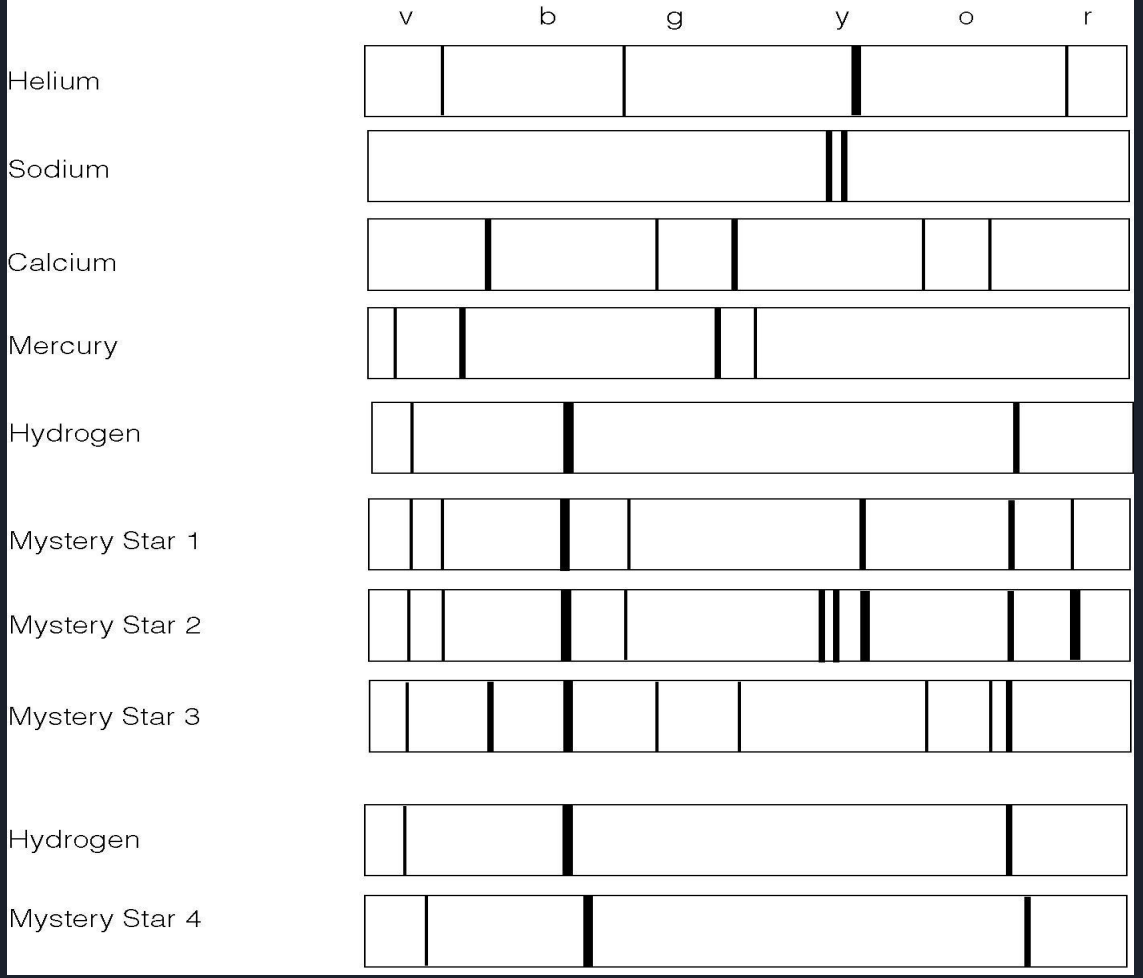
# Finding the spectral colours of each element



-To identify what gases were in a star, scientists view the light coming off stars through a spectroscope

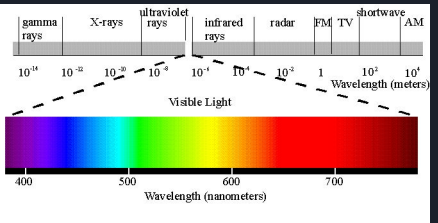
-The spectral lines produced allow scientists to identify what elements are present in any star

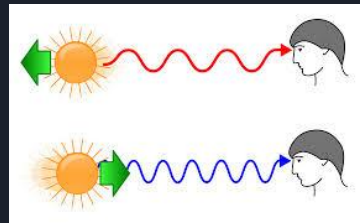



v
b
g
y
o
r
Helium
Sodium
Calcium
Mercury
Hydrogen
Mystery Star 1
Mystery Star 2
Mystery Star 3
Hydrogen
Mystery Star 4

# Red Shift video

- **Spectroscopes not only tell us what a star could be made up of but can also tell us how fast a star is moving towards or away from us**
- **As a light source moves away from us, the light stretches out, making it appear to be red**
- **As a light source moves toward us, the light compresses, making it appear blue**



# Doppler effect

- **What is the Doppler effect? Using compression or expansion of wavelengths to see how an object is moving.**

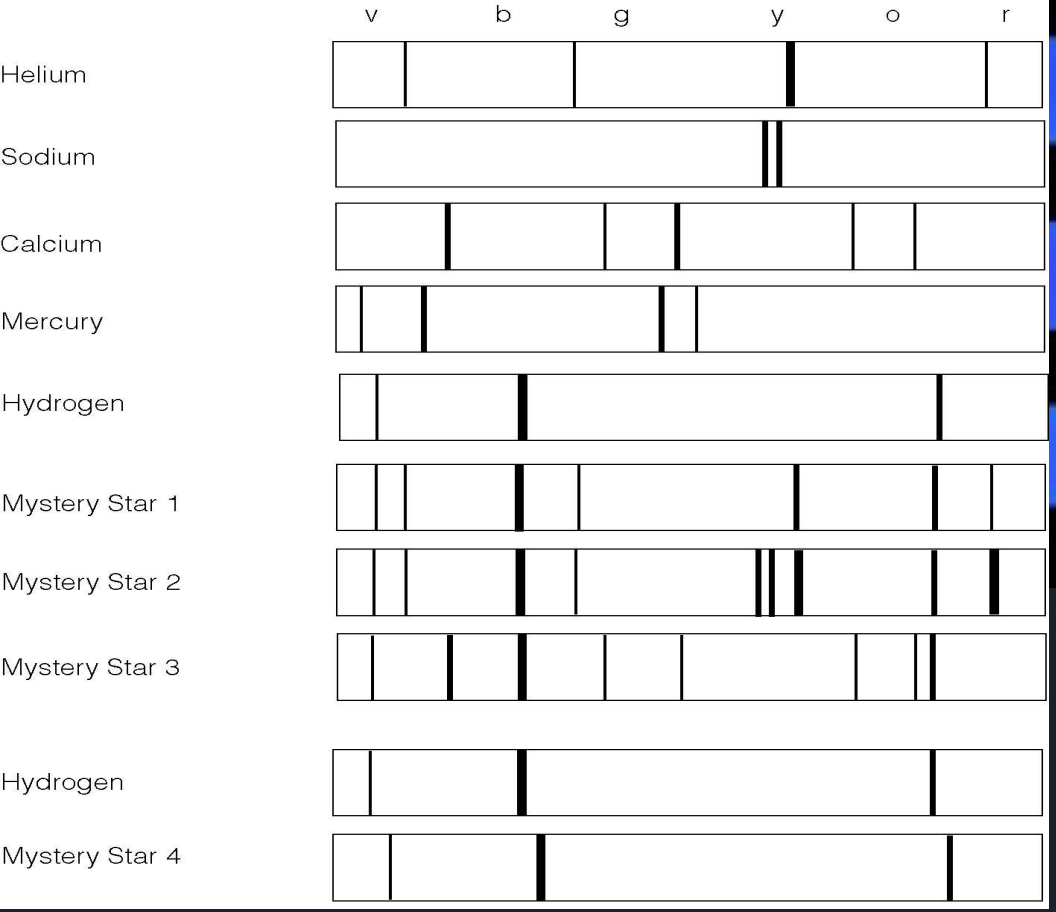
Big Bang Doppler effect

- **As a vehicle approaches you, what happens to the wavelength of the sound wave and how would it hear to your ear?**

- **Siren video**

**- As a vehicle passes you, what happens to its wavelength and now what would it sound like?**


UNSHIFTED
REDSHIFTED
BLUESHIFTED





**What chemical is in Mystery Star 4?**

**What is odd about the spectrum?**

- **Doppler effect video**