Wien's Law, Blackbodies & Spectra

* Required

What is your name? *

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Which period are you in? *

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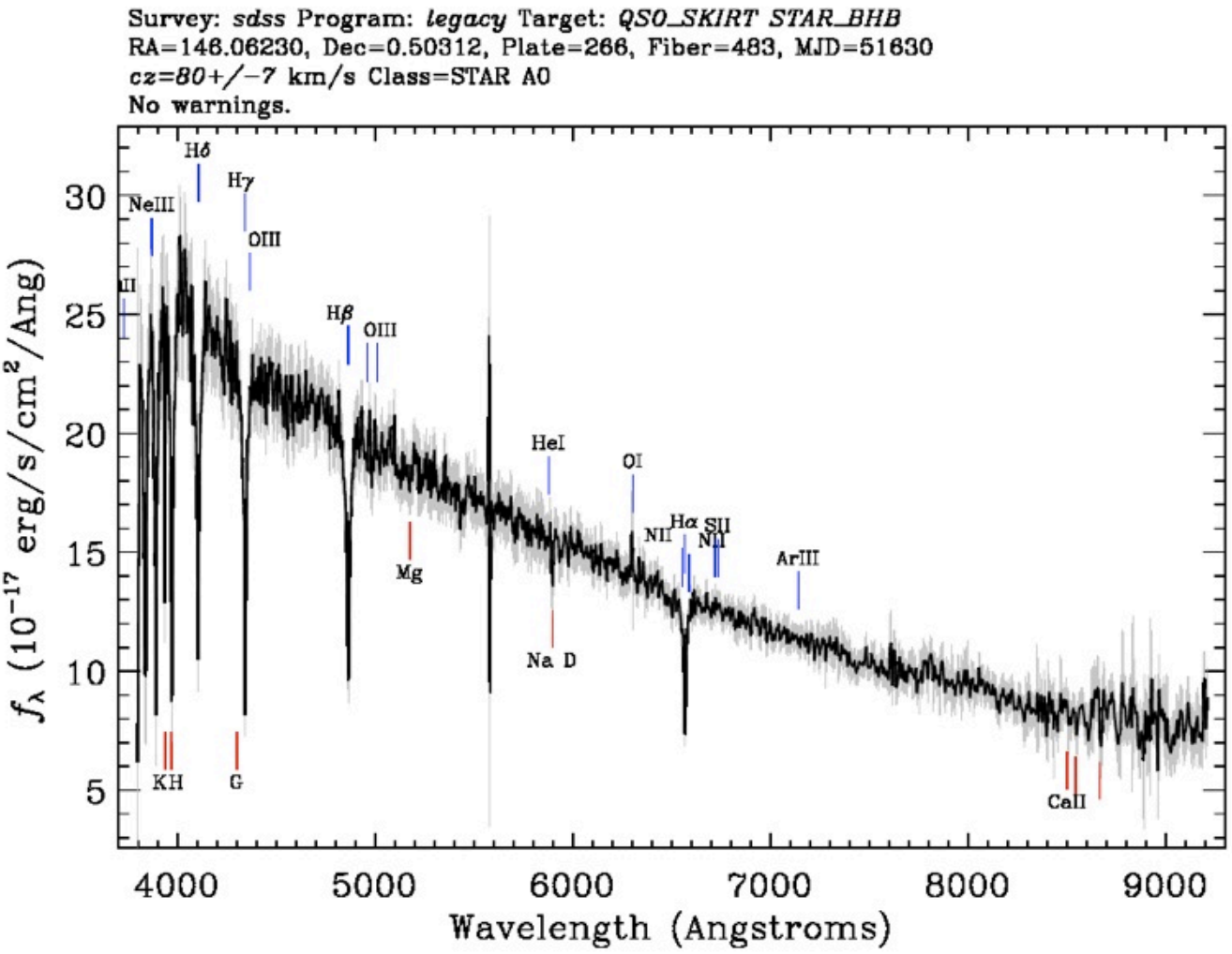
Question 1 Image



1. Look at the spectra in Image 1 above to see the spectra of star #1. Use its peak wavelength to determine its temperature. *

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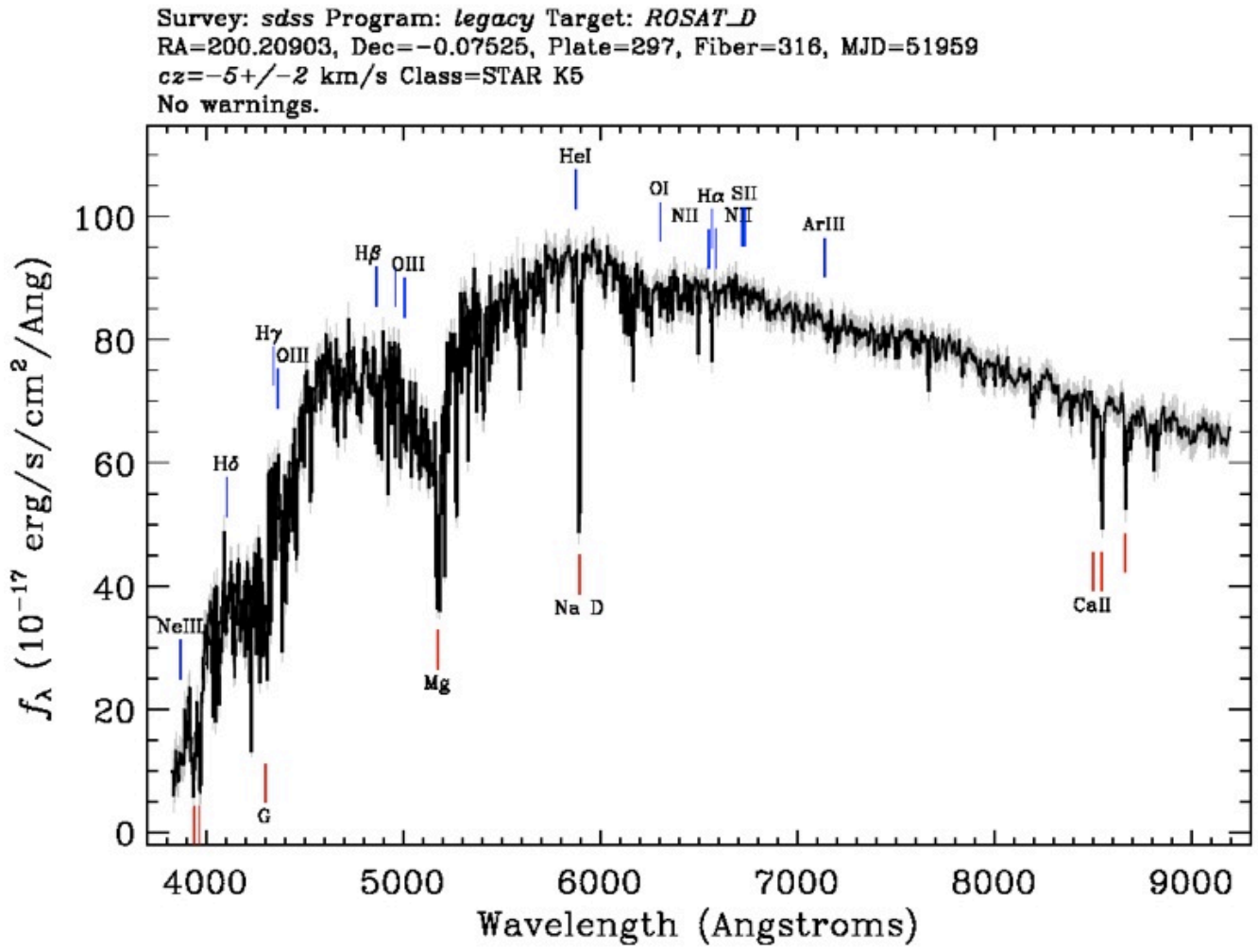
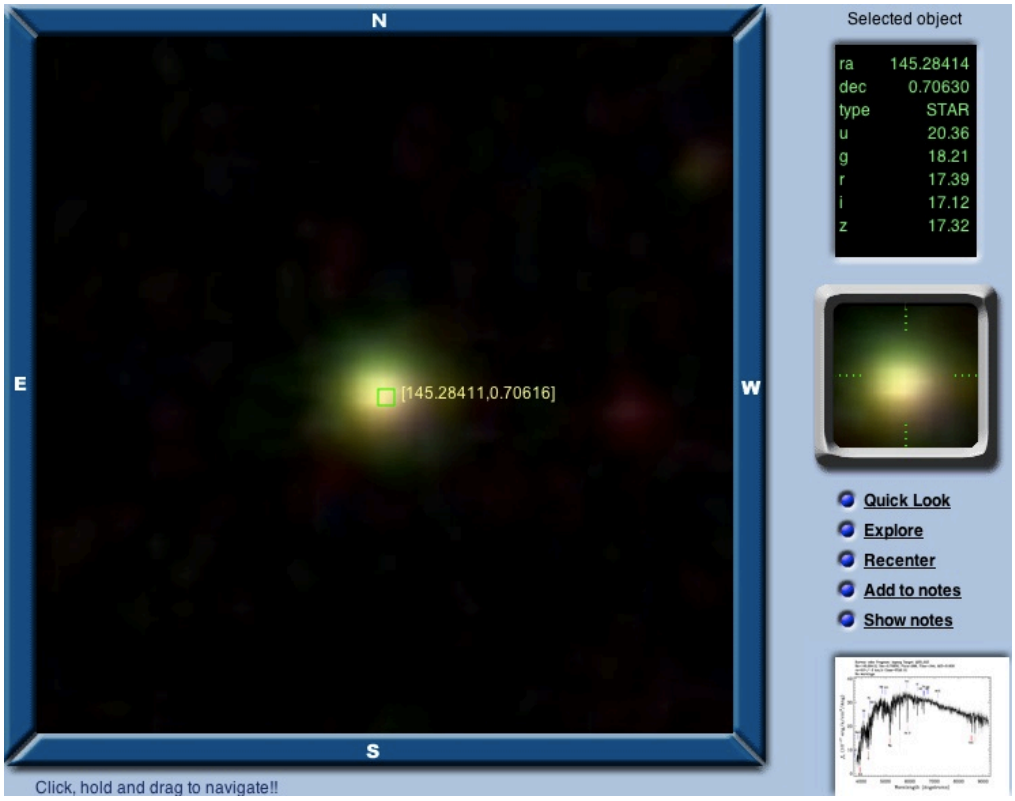
Question 2 Image



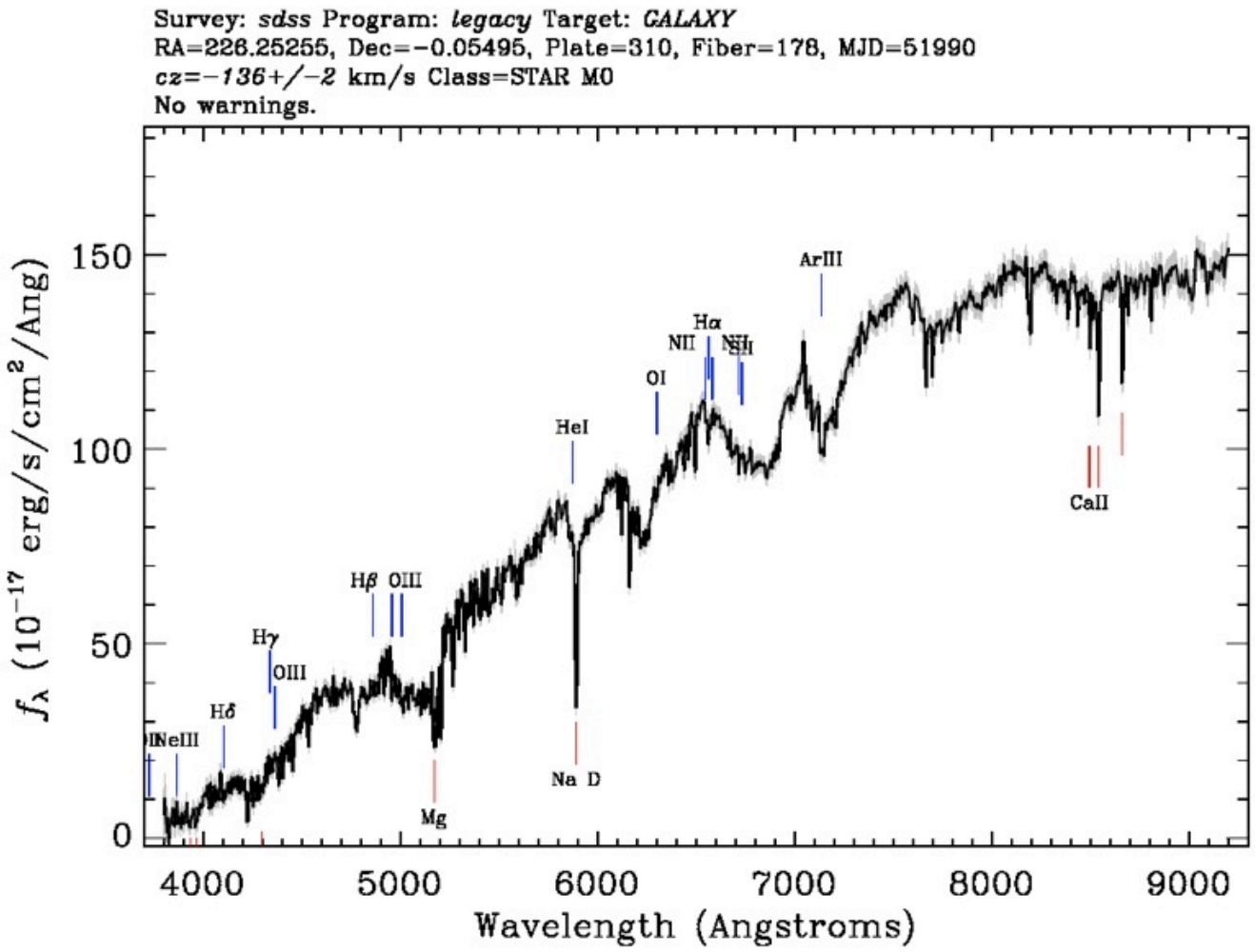
2. Use Image #2 above to determine the temperature of star 2. *

3. Look at star #3's image below. This star is a spectral class K star. What can you say about its relative temperature based on its spectral class? *

Star 3



Question 4 Image



4. Use Image for question #4 above to determine star 4's temperature. *

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Spectral Lines and Spectral Class (also know as Spectral Type) - Use this chart for questions 5 - 7.

Spectral Type	*Temperature (Kelvin)*	*Spectral Lines*
O	28,000 - 50,000	Ionized helium
B	10,000 - 28,000	Helium, some hydrogen
A	7500 - 10,000	Strong hydrogen, some ionized metals
F	6000 - 7500	Hydrogen, ionized calcium (labeled H and K on spectra) and iron
G	5000 - 6000	Neutral and ionized metals, especially calcium; strong G band
K	3500 - 5000	Neutral metals, sodium
M	2500 - 3500	Strong titanium oxide, very strong sodium

5. Use the spectral line chart above and Star #5's spectra image below to determine what spectral class this star is. Explain your reasoning. *

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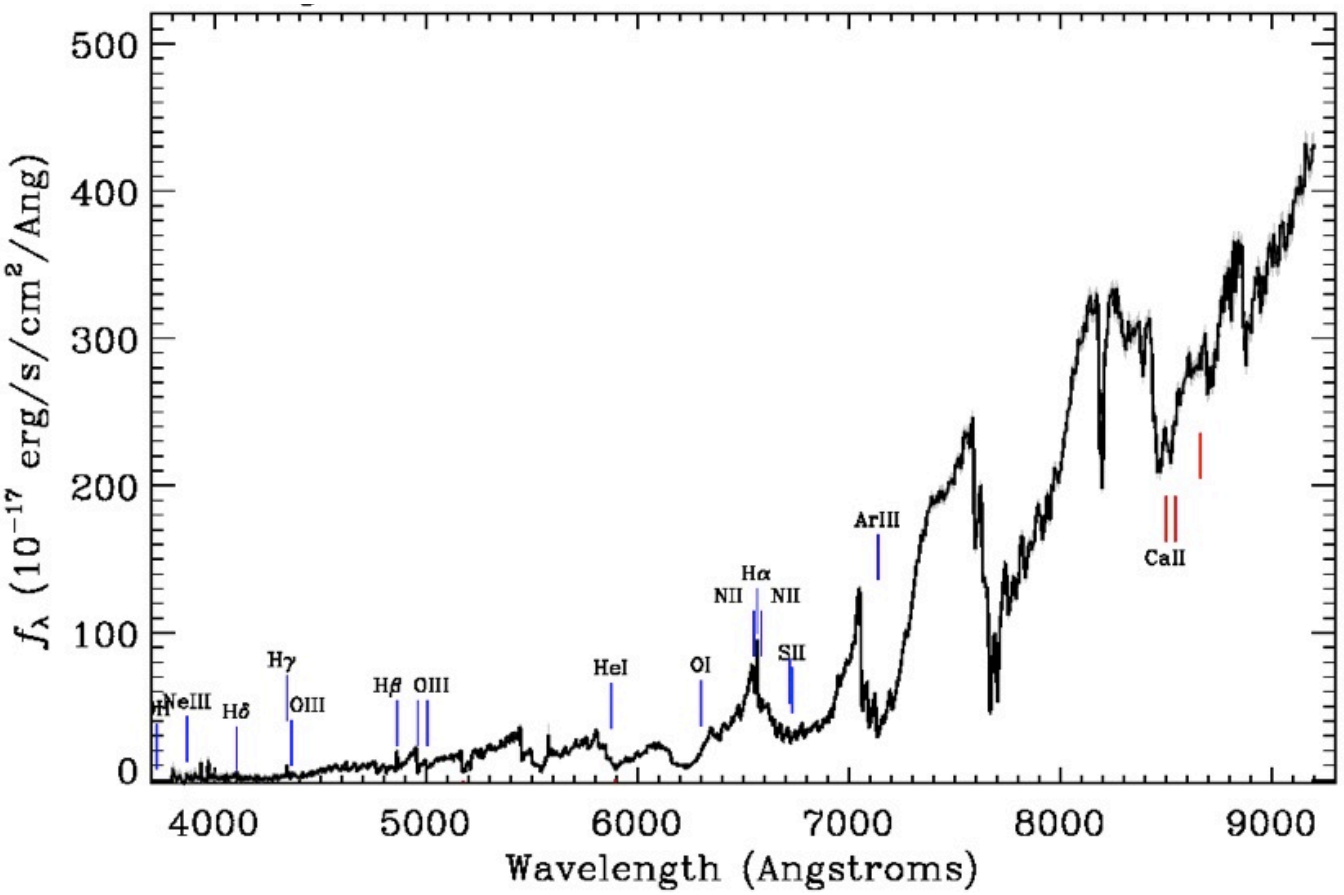
Spectra for Star 5



6. Use the spectral chart above and spectra from Star 6 below to determine what temperature range Star 6 may have. Explain your reasoning for the temperature range you choose. *

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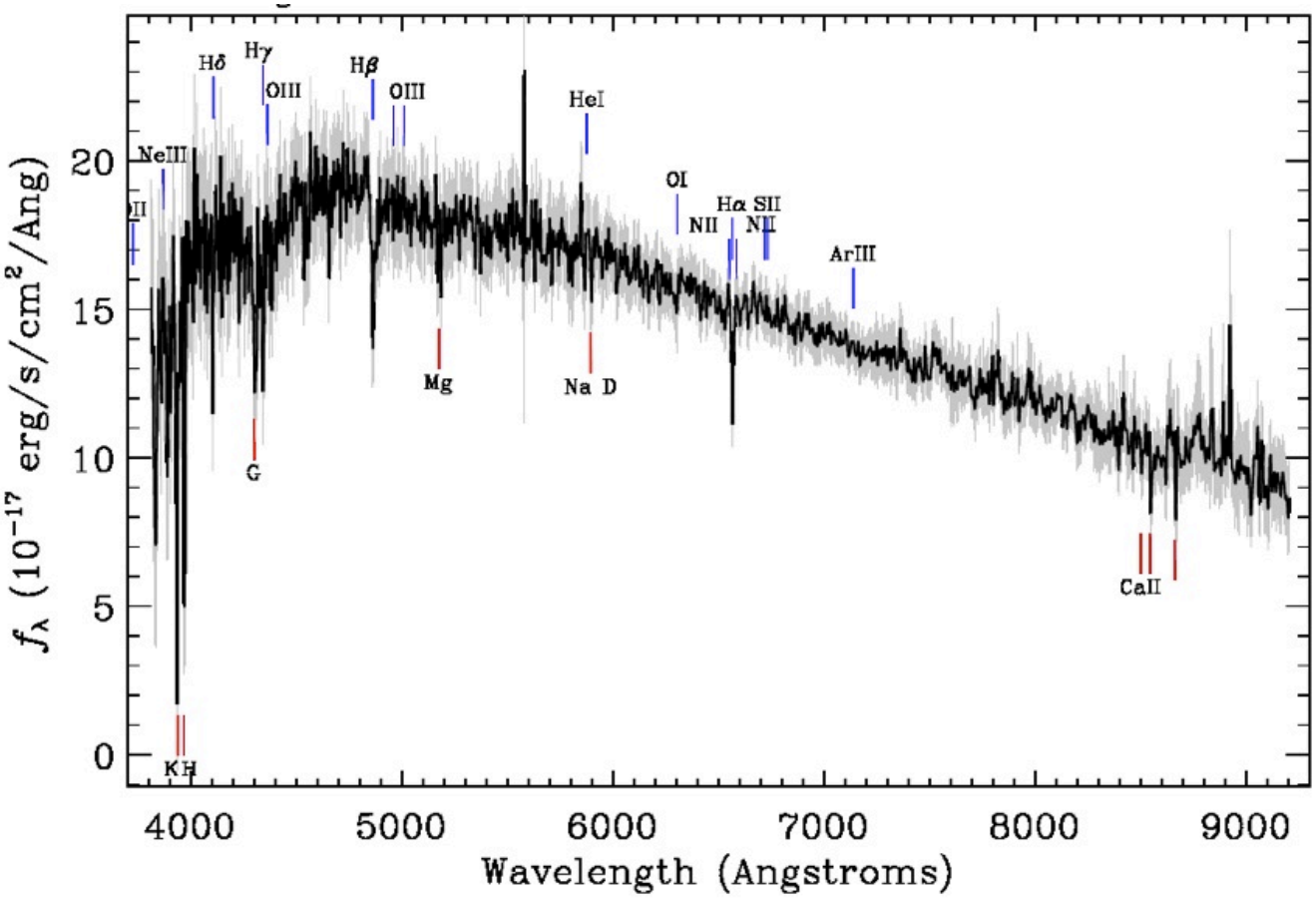
Star 6 Spectra



7. Use the spectral chart above and the image of Star 7's spectra below to determine Star 7's spectral class. Explain your reasoning. *

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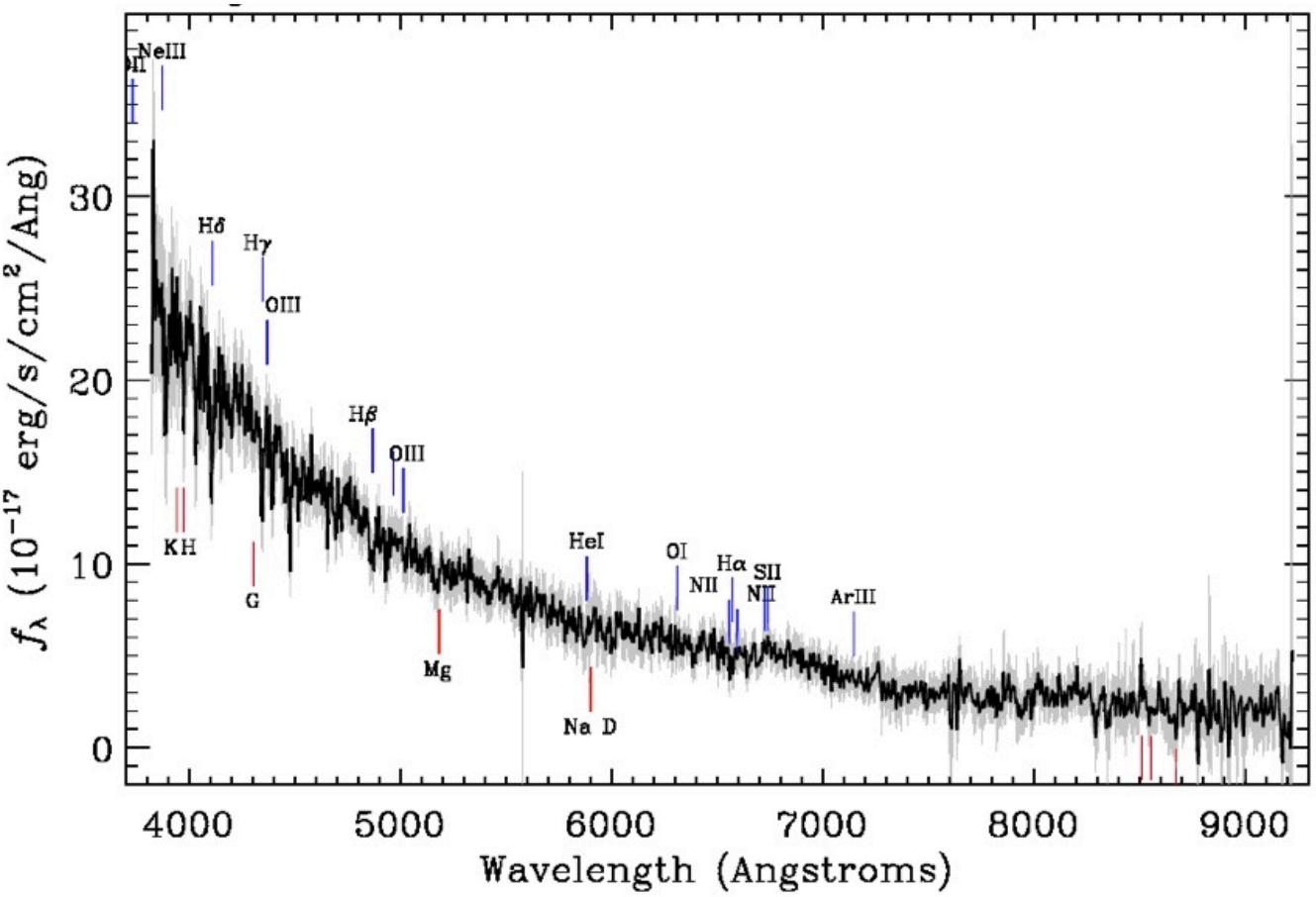
Spectra for Star 7



8. Identify which star is in the image below: Star 5, Star 6 or Star 7. Explain your reasoning of why you think it is the star you chose. *

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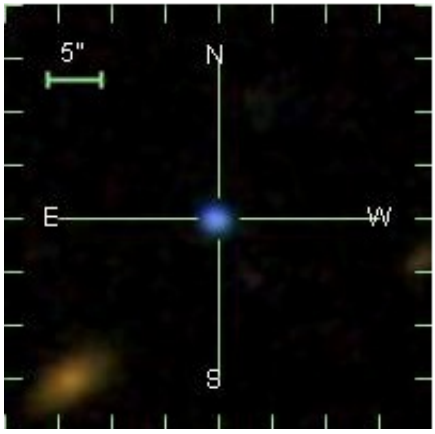
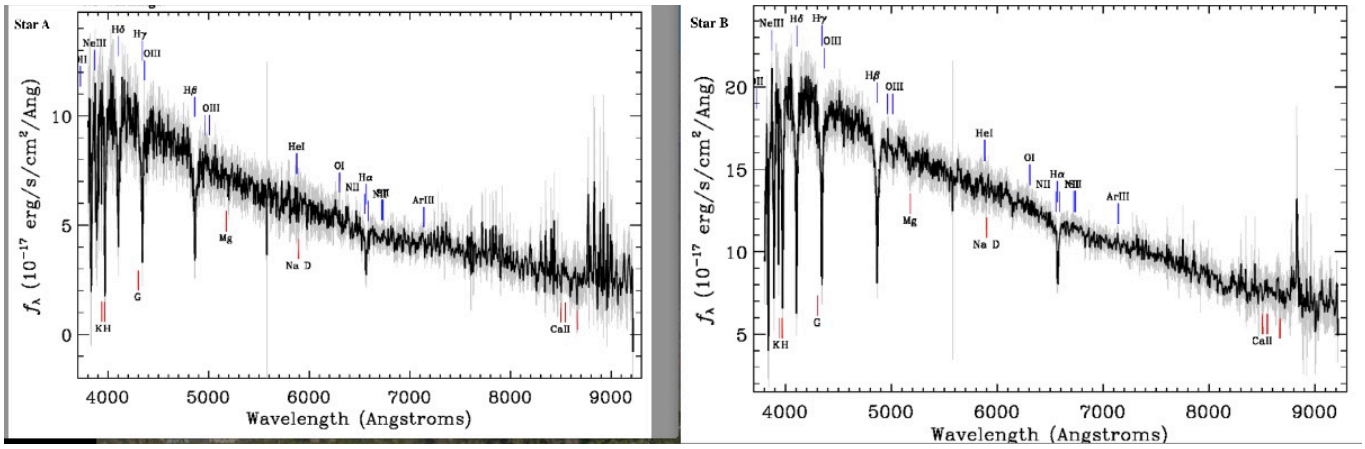
Image of Star for question 8.



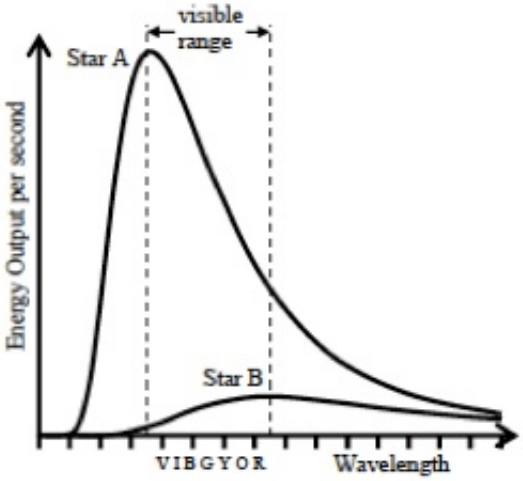
9. Look again at spectra for Stars 5, 6 and 7. a. Which star is the hottest? b. Which star is the coolest? c. Which star is the brightest? *

10. Look at the image below of two blackbody curves from two different stars. Both stars are a class A spectral type. Which star is larger? Remember the x-axis is wavelength and the y-axis is flux or energy (you can also think of it as brightness) given off by the star. Explain your reasoning for your answer. *

Image for question 10.



Use the image of blackbody curves below for questions 11 and 12.



11. Which of the two stars (A or B) emits light with the shorter peak wavelength? *

Mark only one oval.

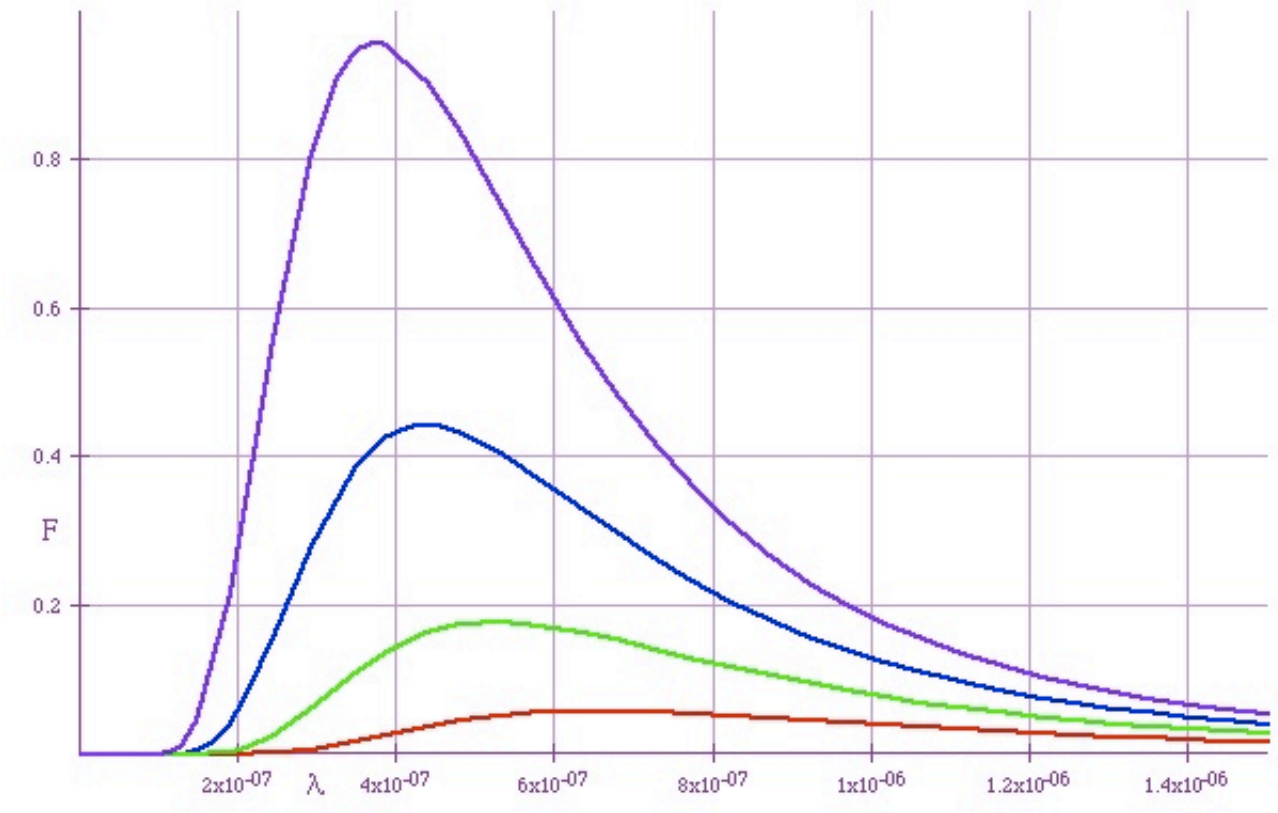
- Star A
- Star B
- Both stars peak emissions are at the same wavelength.
- None of the above are possible.

12. Determine which of the following best describes how Star B would appear as compared with Star A. *

Mark only one oval.

- ◯ Star B would appear more blue than Star A.
- ◯ Both stars would appear more blue than red.
- ◯ Star B would appear more red than Star A.
- ◯ Both stars would appear more red than blue.
- ◯ None of the above.

Image for question 13



13. The image above shows the blackbody curves for four stars. List the stars in order from the coolest to the hottest. Explain your reasoning. Use the color of the line as the identifier for the star. *

14. Using the image above of the four blackbody curves, list them in order of dimmest to brightest. Use the color of the line as the identifier for the star. *

Question 15 Link

http://skyserver.sdss3.org/public/en/tools/explore/summary.aspx?id=0x112d172f406a0056&spec=0x29ac69d02e019c00&apid=

Use link #15 above and view the SDSS Explore page for SDSS Star 1237670964308344918. Look over the information on that page and the spectral curve and answer the question below. *

1. What is this star's peak wavelength? 2. What is this star's temperature? 3. What is this star's spectral type? 4. Name one element found in this star. 5. Through which filter (ultraviolet/blue, green, red, infrared, far infrared) is this star the brightest?

To read more of blackbody radiation, temperature, peak wavelength and color of stars, read the first several sections of chapter 11 in textbook Cosmos.

nd edition of The Cosmos, pages 217 - 227. Section titles are below.
rd edition of The Cosmos, sections "Colors and Temperatures" "The Spectral Types of Stars" "Luminosity" A Closer Look boxes "Using Absolute Magnitudes" "A Star's Luminosity"