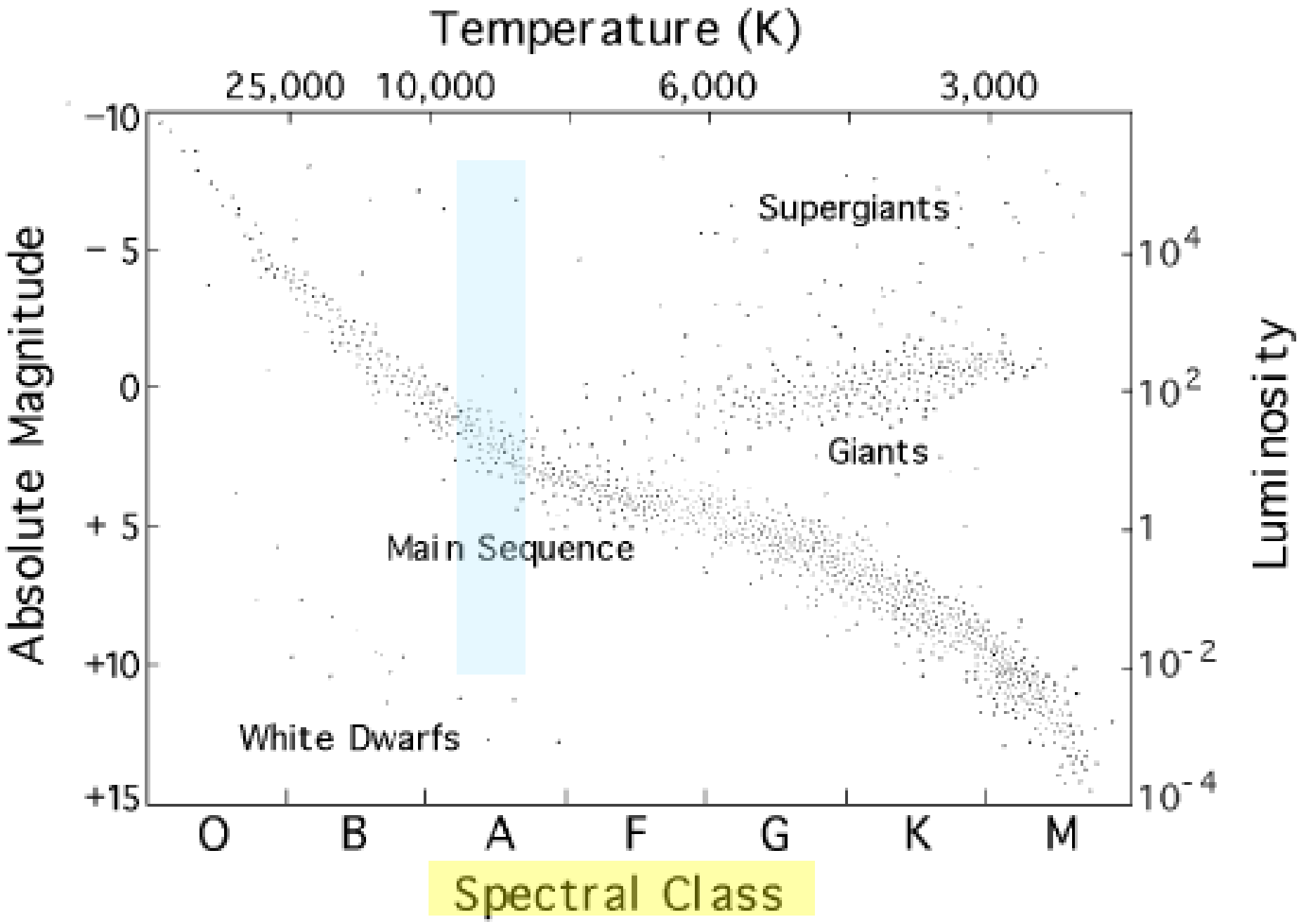
Understanding how the HR diagram works.

The aim of this activity is to plot stars according to their stellar class and absolute magnitude, and see how they line up along the Main Sequence on the HR diagram.

Given this list of 12 of the closest stars to us:

Star	Stellar class	Apparent magnitude	Absolute magnitude	Distance (ly)
Sun	G2	−26.74	4.85	0
Proxima Centauri	M5.5	11.09	15.53	4.24
α Centauri A (HD 128620)	G2	0.01	4.38	4.36
α Centauri B (HD 128621)	K1	1.34	5.71	4.36
Barnard's Star	M4	9.53	13.22	5.95
Wolf 359 (CN Leonis)	M6	13.44	16.55	7.85
Lalande 21185	M2	7.47	10.44	8.3
Sirius A	A1	−1.46	1.42	8.65
Sirius B	A2	8.44	11.34	8.65
Luyten 726-8 A	M5	12.54	15.4	8.79
Ross 154	M3.5	10.43	13.07	9.7
Epsilon Eridani	K2	3.73	6.19	10.44

Plot them on the H-R Diagram (p. 2), using their spectral class (horizontal axis) and absolute magnitude (vertical axis). Note: The number next to each spectral class tells you how close the star is to the left (higher temperature) or right (lower temperature) of the spectral class in which it falls. For example: The Sun is a G2 star, so it is closer to G than to K. You can print out this black-and-white diagram and draw on it, or copy it to a Word document, and insert a symbol (small dot, asterisk, x, etc.) at the coordinates where each star belongs. After you have finished plotting the stars on the HR diagram, be sure to answer the questions on page 3!


Temperature (K)
25,000
10,000
6,000
3,000
Absolute Magnitude
−10
− 5
0
+ 5
+10
+15
Luminosity
10^4
10^2
1
10^{-2}
10^{-4}
Supergiants
Giants
Main Sequence
White Dwarfs
O
B
A
F
G
K
M
Spectral Class

1) Write down the definitions of the following terms that are discussed in the lectures

a) Apparent magnitude:

b) Absolute magnitude:

c) Luminosity:

d) Main Sequence Stars:

2) A small problem:

a) From its position on the HR diagram, what is the approximate temperature of Proxima Centauri?

b) From its position on the HR diagram, what is the approximate luminosity of Proxima Centauri in terms of solar luminosities?