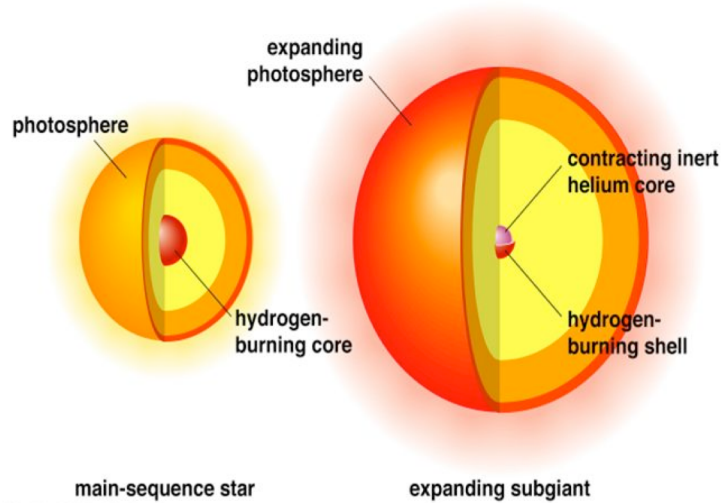
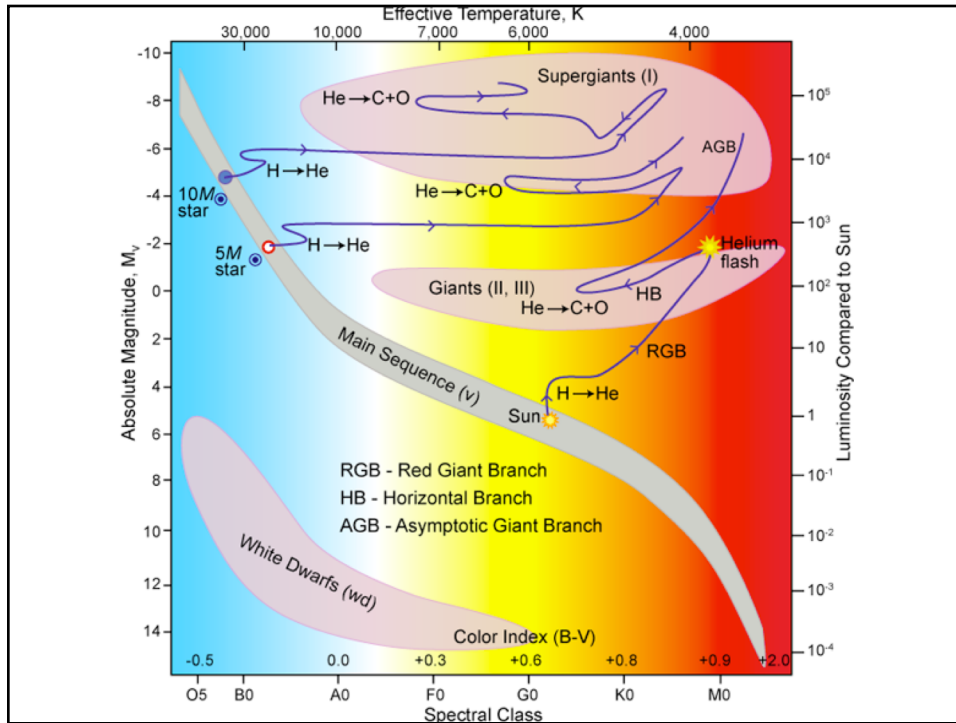


After a star ends its main-sequence life, its inert helium core contracts while a hydrogen shell begins fusion at a higher rate. This forces the star's outer layers to expand outward.

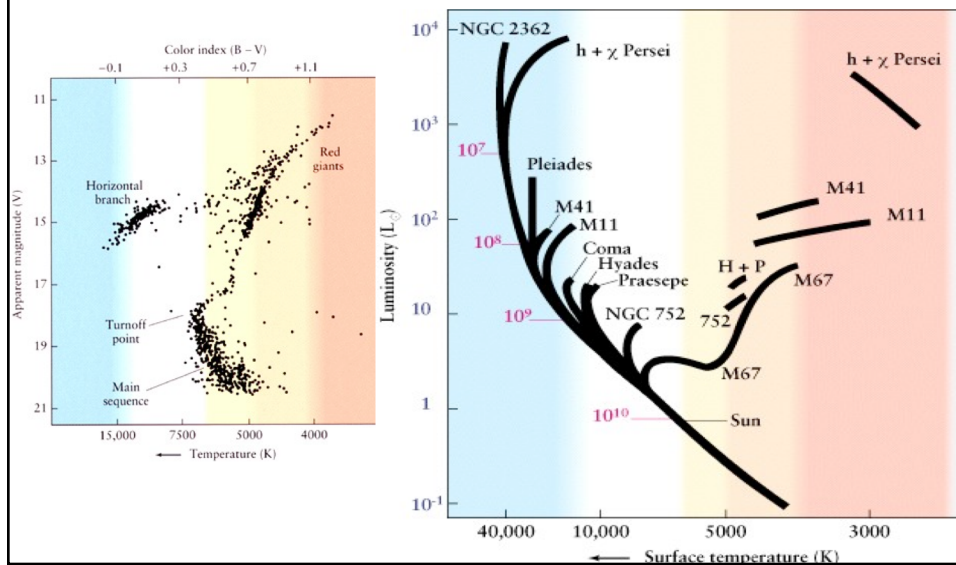


Copyright © Addison Wesley

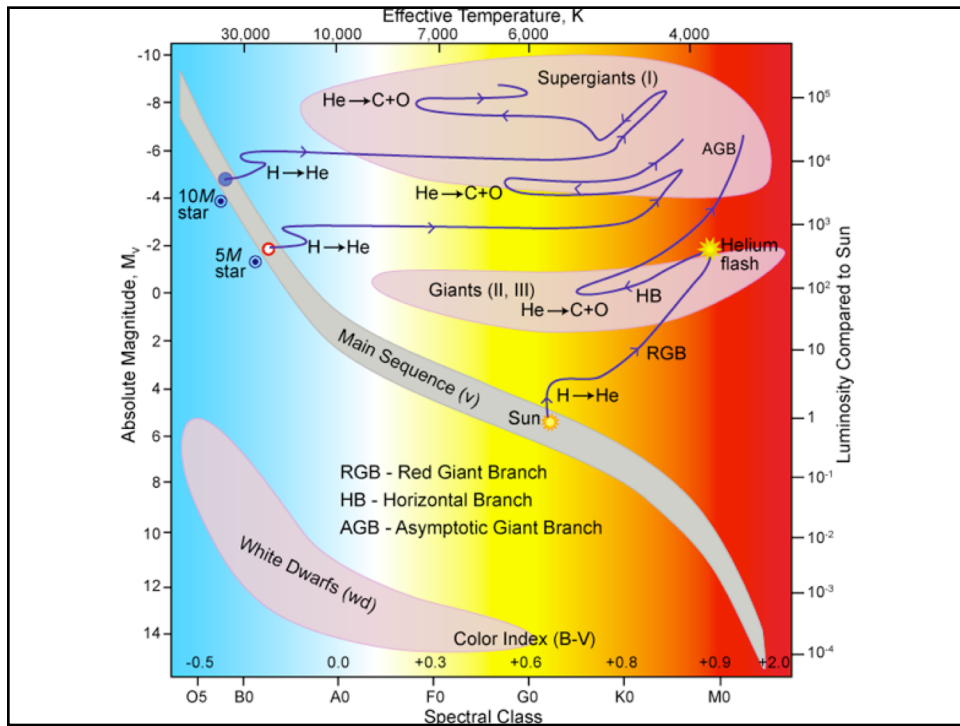
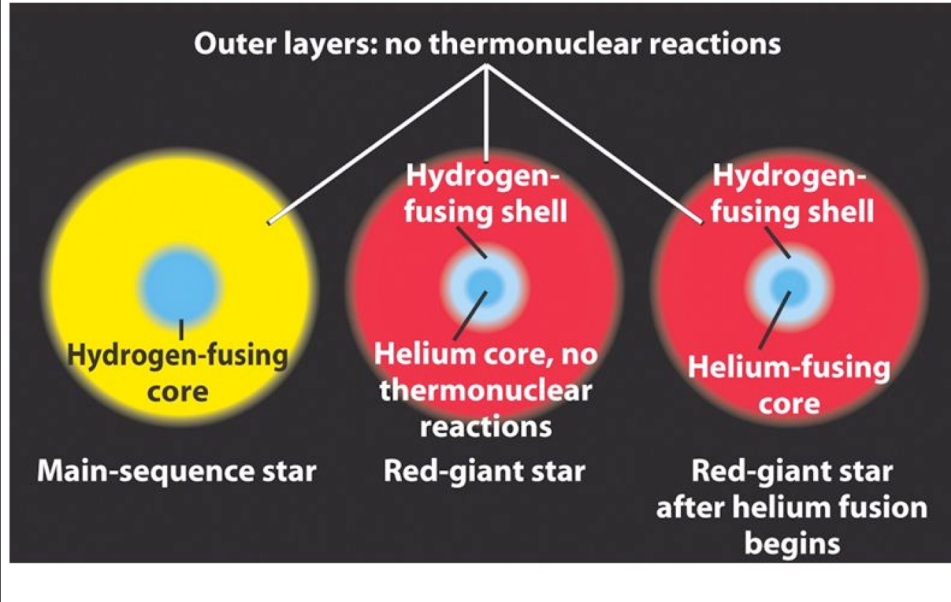


Star Cluster H-R Diagram

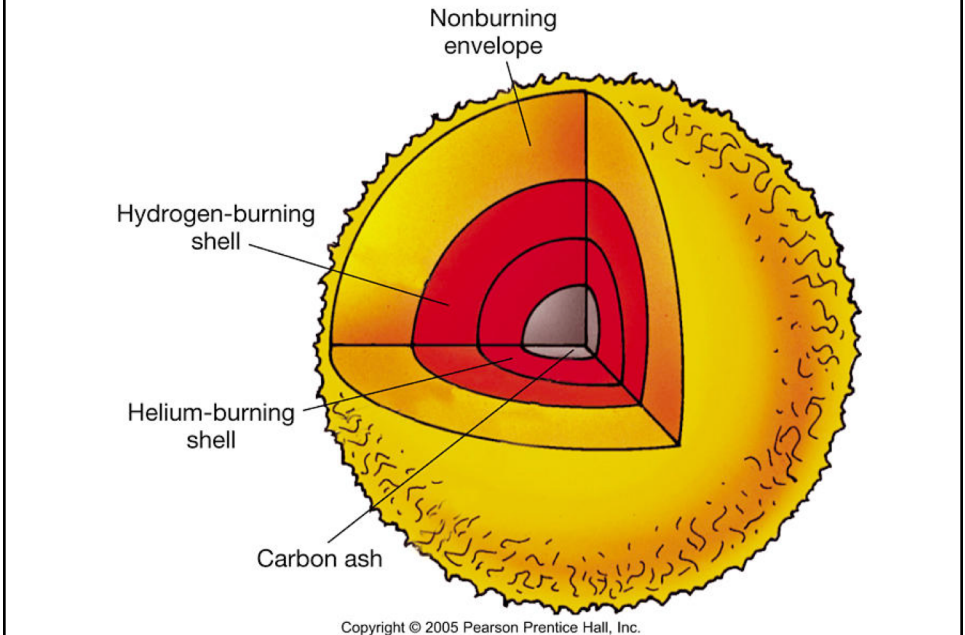
The main sequence "turnoff" tells you the age of the Cluster



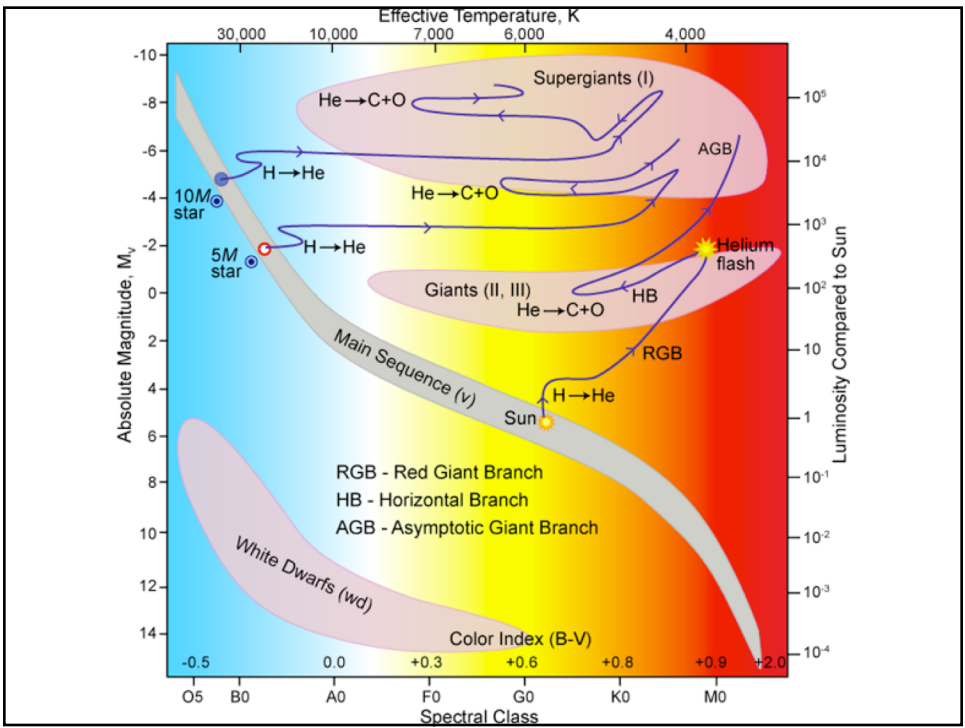
Stages of Nuclear Burning



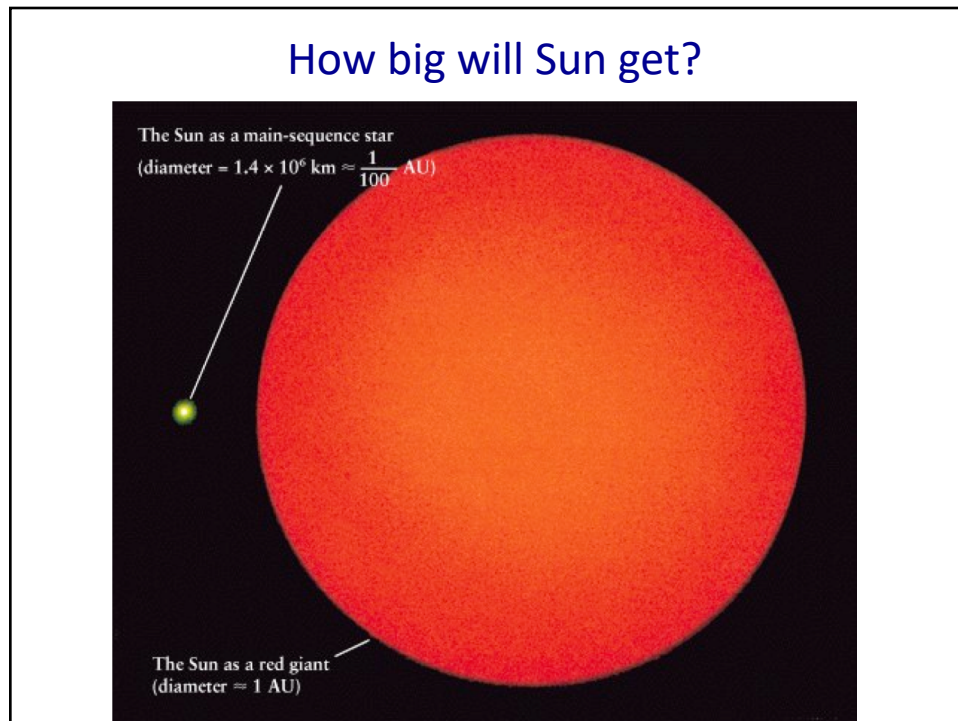
AGB = Asymptotic Giant Branch



Copyright © 2005 Pearson Prentice Hall, Inc.



How big will Sun get?



Evolution of the Sun – A Timeline

TABLE 20.1 Evolution of a Sun-like Star

Stage	Approximate Time to Next Stage (Yr)	Central Temperature (10^6 K)	Surface Temperature (K)	Central Density (kg/m^3)	Radius (km)	Radius (solar radii)	Object
7	10^{10}	15	6000	10^5	7×10^5	1	Main-sequence star
8	10^8	50	4000	10^7	2×10^6	3	Subgiant branch
9	10^5	100	4000	10^8	7×10^7	100	Helium flash
10	5×10^7	200	5000	10^7	7×10^6	10	Horizontal branch
11	10^4	250	4000	10^8	4×10^8	500	Asymptotic-giant branch
12	10^5	300	100,000	10^{10}	10^4	0.01	Carbon core
		—	3000	10^{-17}	7×10^8	1000	Planetary nebula*
13	—	100	50,000	10^{10}	10^4	0.01	White dwarf
14	—	Close to 0	Close to 0	10^{10}	10^4	0.01	Black dwarf

* Values refer to the envelope.

Copyright © 2005 Pearson Prentice Hall, Inc.