Star Type Reading

Star cluster 996

What are the different types of stars?

Stars change over time. Different stages in a star's life represent the different star types. Stars are born from clouds of gas and dust called nebulas and start out as protostars. These young stars eventually become main-sequence stars that burn hydrogen and range from hot, bright, massive blue stars to cooler, dimmer, less massive red dwarfs. Stars spend most of their lives as main-sequence stars.

When a main-sequence star runs out of hydrogen, it begins using other fuels. Its temperature and luminosity change. This marks the end of its life. The end of a star's life is short compared to the amount of time it spends as a main-sequence star.

The end of a star's life depends on its mass. Stars of low mass expand into red giants. Red giants eventually shed their outer layers of gas to leave behind the very hot core of the star to become white dwarfs. Those stars with a larger mass expand into supergiants that use up energy so fast that they become unstable and explode into supernovas. A supernova will either become a very dense star called a neutron star or will collapse into a black hole.

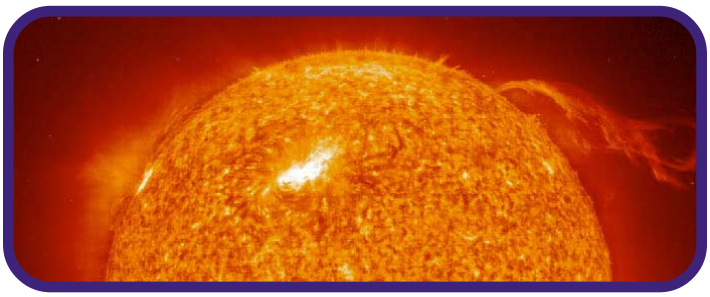
How do scientists decide a star's type?

A star's type is determined by its temperature (measured in Kelvin), mass and luminosity. For main-sequence stars, the Hertzsprung-Russell (H-R) diagram shows that there is a relationship between these features. The larger a main-sequence star is, the hotter and more luminous it is. A star's color is related to its surface temperature. The coolest, smallest, dimmest stars are red dwarfs. Hotter, medium-sized stars are yellow stars, and the hottest, largest, most luminous main-sequence stars are blue stars.

Red Giant, blue and yellow stars

Other star types include giants, white dwarfs and red dwarfs. Giants are very large stars and include red giants and supergiants. White dwarfs and red dwarfs are very small, dim, but hot stars.

What makes the Sun so great?



The Sun is an ideal star for life compared to other main-sequence stars, because it is stable and so keeps Earth's temperature constant. The Sun also burns for a long time.

How will the Sun's life end?

Since scientists have evidence that the Sun will become a red giant in 3 billion years, this is the future we can imagine for our planet.

Questions

(Answer on a separate sheet of paper)

1. What are the stages in a low-mass star's life?
2. What are the stages in a high-mass star's life?
3. What determines a star's type?
4. What makes the Sun an ideal star for life?
5. Is the Sun a low-mass or high-mass star?
6. Looking at the H-R diagram, what are the:
   - hottest, dimmest stars?
   - coolest, dimmest stars?
   - brightest, hottest stars?
   - brightest, coolest stars?

Hertzsprung-Russell Diagram