Gravity pulls atoms of hydrogen gas together in the spinning nebula. More and more gas is pulled in over millions of years. The cloud begins to spin faster and faster. The hydrogen atoms collide. The gas heats up. The temperature in the center reaches 15 million degrees Celsius. Nuclear fusion begins to take place. The heat causes the cloud to glow. Mass continues to accumulate. Finally, it is stabilized. A star is born.

People have wished on stars for many years. Sailors used the North Star to guide them over the seas at night. Like clouds in the daytime sky, stars form pictures at night. They are called constellations. You probably know the Big Dipper, Orion's Belt, and Pegasus. Astrologers use the stars to make predictions about events in people's lives. Stars are very familiar to us.

As we look up at the nighttime sky, the stars all look pretty much alike. But there are actually different sizes and colors of stars. Red stars are the coolest; blue are the hottest. Yellow stars have a medium temperature. Think of the colors of the flames of a bonfire. The top of the flame is red; it has the least heat. The middle of the flame is yellow. The bottom of the flame, where there is the most heat, is blue. Like a flame, you can tell how hot a star is from its color.

Dwarf stars are very common. Their sizes range from half the size to one hundred times smaller than our Sun. The red dwarf is the most common star in the galaxy. However, they are not easily seen. They burn their fuel very slowly and are not as bright as others in the sky. They are like flashlights in a dark auditorium. When a big spotlight comes on, the flashlights can't be seen. But because they burn more slowly, red dwarfs will live a long time, maybe trillions of years!

Our Sun is a medium yellow star. It has a medium size and temperature. Yellow stars burn fuel more quickly than red ones. They are also brighter. They are like the spotlights in the dark auditorium.

Yellow stars have a shorter life span than red ones, only ten billion years or so. Our Sun is about five billion years old. Toward the end of its life, it will become much larger. It will swallow up the Earth and the other inner planets. A cloud of gas called a planetary nebula will form around it.

When a medium star begins to die, it expands and becomes a red giant star. It begins to run out of fuel. The hydrogen is almost all used up. The core...
Name _______________________

becomes more compact. It begins to burn hotter with a new fuel, helium. The heat expands the star like a balloon.

When the Sun dies, it will still glow for billions of years. It will take that long to cool off. As it cools, it will become a white dwarf. Once it stops glowing, it will become a black dwarf. There are no known black dwarfs in our universe.

Blue giant stars are very bright and very hot. They burn fuel very quickly. It runs out in ten thousand to 100 thousand years. Even though they are very rare, many of the stars we see at night are blue giants. They burn brightly, and their light shines a very long distance.

Blue giant stars die as a supernova. This is a spectacular explosion in space. It can be brighter than the entire galaxy and can be seen from far, far away. Some scientists think a supernova is what caused our Sun and solar system to form.

There are also supergiant stars. They are like giants, only bigger. If our Sun was a supergiant, it would reach clear to Uranus. Dead supergiants often turn into black holes!

As you wish upon that first star you see in the night sky, think of it as you now know it. It is a bright ball of burning gas. Is it a dwarf or a giant? Is it yellow, blue, or red? How long will it continue to shine?

A Star is Born

Questions

1. Name the three colors of stars from coolest to hottest.

2. The most common kind of star in our galaxy is the:
   A. medium yellow
   B. giant blue
   C. red dwarf

3. Why is a red dwarf hard to see?
4. What kind of star is the Sun?
   A. giant blue
   B. red dwarf
   C. medium yellow

5. When the Sun dies, what will happen to the inner planets?

6. Blue giant stars:
   A. burn out quickly
   B. last for trillions of years
   C. are the coolest stars

Find out more about supernovas. Write a paragraph.
Tell in your own words how a star is formed.