

RED GIANT



Aldebaran is much larger than the Sun, but its mass is only 1.7 times greater.

BIG RED

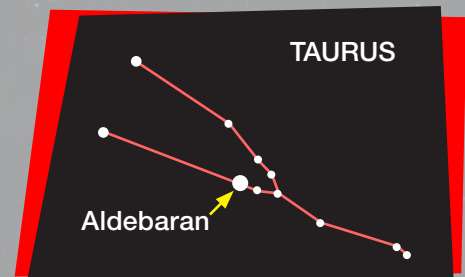
“Our next stop will be Aldebaran,” Captain Gamma announced. The crew looked up excitedly.

Kara reset the Star Reader. Where had she heard that unusual name before? Then she remembered—Aldebaran (all-DEB-er-on) was one of the brightest stars in Earth’s sky.

Soon the *Stella* was bathed in red light. “This star is enormous!” Manolo shouted. “It’s 44 times wider than the Sun, but its temperature is much cooler. How does such a cool star shine so brightly?”

Captain Gamma turned off the cabin lights and switched on a small reading lamp. “This light is bright, but it’s very small,” he explained, shining the light at the floor. Then he turned on the cabin light, which lit up the whole deck. “The cabin light isn’t as bright, but it’s much larger, so it puts out more total light.”

“Sounds like a red giant,” said Kara. “When stars with a low mass run out of hydrogen fuel, they expand to an enormous size. They look bright from far away.” Kara wondered if people on Earth realized that one of their brightest stars was a cool, aging giant.



Aldebaran is the brightest star in the constellation Taurus (the bull).

THE END OF THE SUN

Aldebaran has only a little more mass than the Sun. So why is it so large?

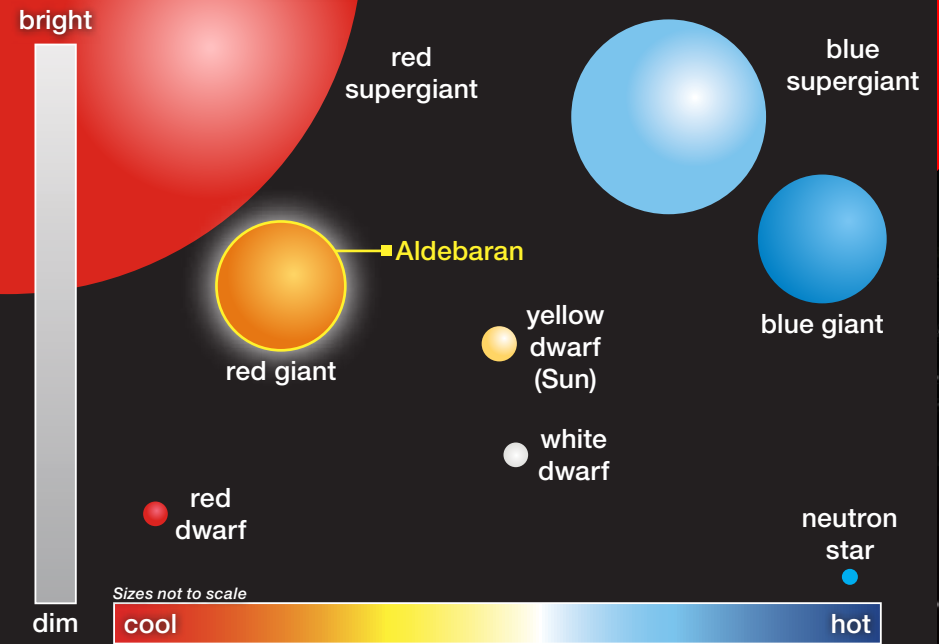
A star releases energy through nuclear fusion. This process turns hydrogen into helium. But over time, the star burns up all its hydrogen, like a car running out of gas. When this happens, the star expands outward. It can grow to one hundred times its starting diameter! The star is now a red giant. It has a life span of "only" a few million years.

Someday, our Sun will run out of hydrogen and become a red giant. It will cool down and expand. The Sun will get so big that it will swallow up Mercury and Venus, and maybe even Earth. But don't worry—that won't happen for at least five billion years!

Math Moment

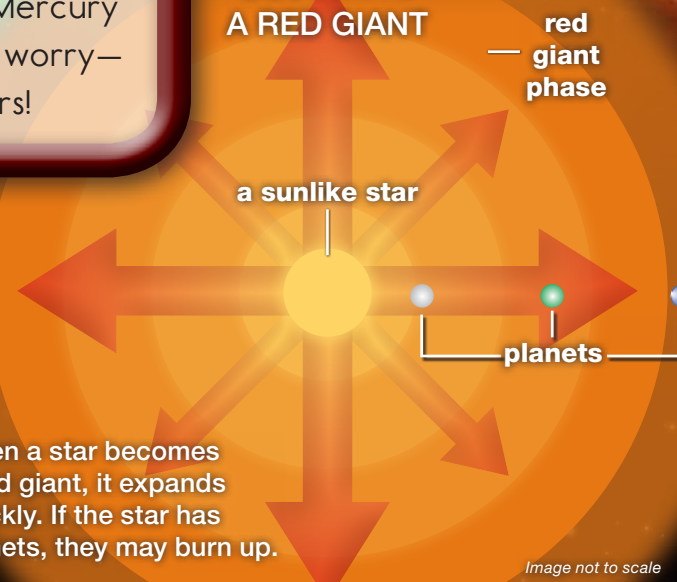
The Sun is about 1.4 million kilometers wide. When it becomes a red giant, it could be 100 times wider. How wide will it be then?

COMPARING STAR TYPES



Aldebaran is a red giant. Red giants are cool, which is why they look red. They are also bright.

BECOMING A RED GIANT



When a star becomes a red giant, it expands quickly. If the star has planets, they may burn up.



Eventually, gravity can no longer hold a red giant star together, and the star loses its outer layers. The clouds of gas and dust stay around the fading star. They form a *planetary nebula*.