

Introduction

A Universe of Stars

When the sun goes down, **stars** begin to speckle the darkening sky. You can see thousands just by looking up from a dark location on a clear, moonless night. In some places, stars are so close together, their glow forms a pathway of light in the sky. In others, they are farther apart. **Our universe is home to billions of trillions of stars,** including our sun.

Our sun is the nearest star to Earth. The most **massive stars are 1,500 times bigger than the sun.** Less massive stars are closer to the size of planet Jupiter. **Astronomers,** the scientists who study stars, learn about them by studying the energy of the light stars emit. They use powerful **telescopes** to observe the stars in our universe. And they are making exciting new discoveries all the time!

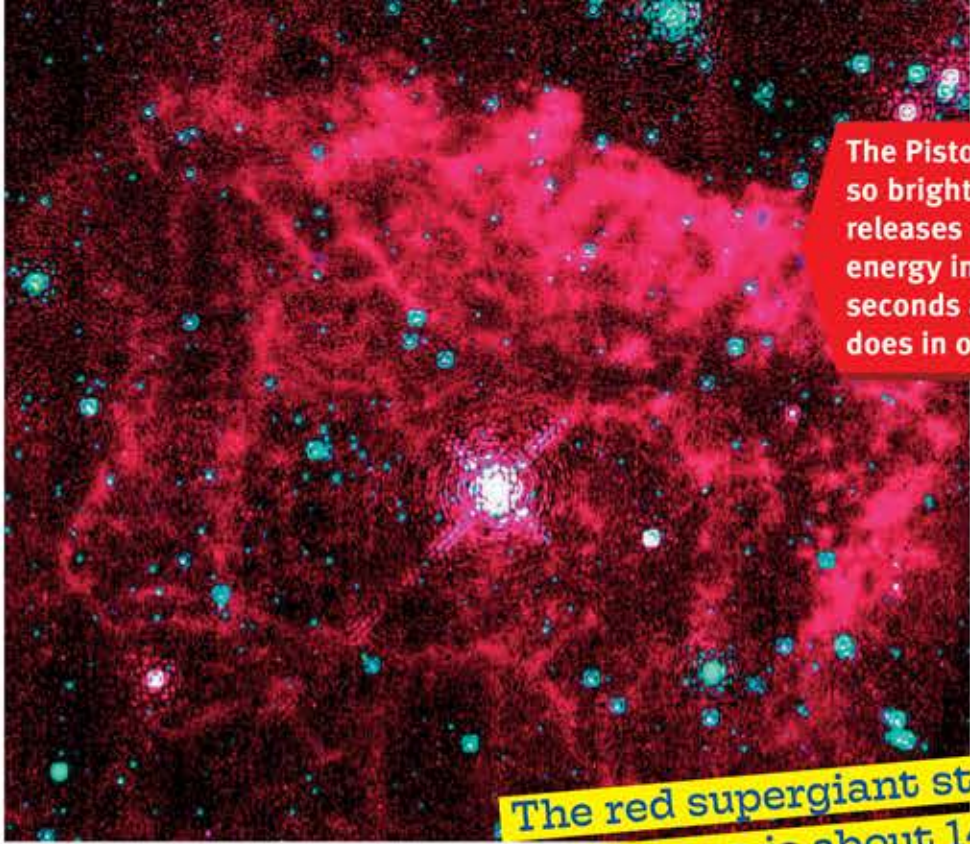
CHAPTER

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Star Traits

The universe contains different types of stars, and each type of star has specific traits. These include a star's size, color, and temperature. Stars are also classified, or grouped, based on their brightness, or how much light they create. Astronomers observe all of these traits in order to gather as much information as they can about these glowing balls of gas.

Many trillions of stars shine throughout the universe.



The Pistol Star is so bright that it releases as much energy in six seconds as our sun does in one year.

The red supergiant star Betelgeuse is about 14,000 times brighter than our sun!

Star Brightness

Astronomers describe star brightness by comparing **luminosity**. This is the amount of light a star emits, or gives off. The more light a star emits, the more luminous it is. A star's luminosity depends on its size. Large stars have more surface area to release more energy, so they are the most luminous. Stars that are closer to Earth also seem brighter.

Star Size

The easiest way to imagine the size of a star is to compare it to our sun, which is a medium-size star, known as a yellow dwarf. The smallest stars, red dwarfs, are also the most common stars in the universe. They are less than 10 percent the size of the sun. The largest red dwarfs are half the size of the sun. The most massive stars are called giants and supergiants. Giant stars are up to 100 times more massive than the sun. Supergiants can be hundreds of times larger.

Many stars are larger than our sun.

