



Chapter 2

The Sun

The sun sits at the center of our solar system. This huge body produces the heat and light energy that make life possible on Earth. It also holds the solar system together through its gravitational pull.

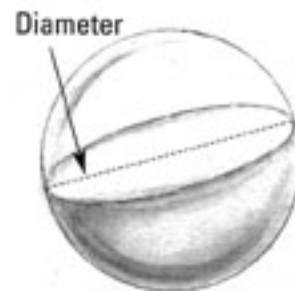
You could fit more than a million Earths inside the sun.

The sun is a star. To us, the sun looks much larger and brighter than any

other star. But that's only because it is so close to us. The sun is about 93 million

miles (150 million km) from Earth. Our next closest star, Proxima Centauri, is about 265,000 times more distant!

It takes about eight minutes for light to travel from the sun to Earth. It takes more than four years for light to travel from Proxima Centauri to Earth!



Diameter is the distance straight through the center of a circle.

Sun Stats

Like all stars, the sun is a fiery ball of gas. Its diameter is an enormous 865,000 miles (1,392,000 km) — about 110 times the diameter of Earth. The sun is also incredibly massive. It weighs a thousand times more than everything else in the solar system combined!

The sun's power comes from its center, which is called the core. In the core, intense heat and pressure force hydrogen

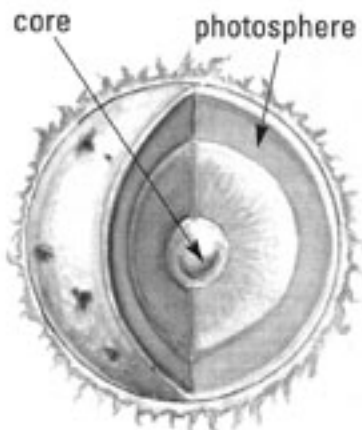
Ray of Light

The sun gives off about 40 percent of its energy as light. The other 60 percent is heat. The sun's light and heat energy stream outward through space at a speed of 186,000 miles per second (297,600 kps). Earth receives only one two-billionth of all the energy the sun gives out!

Tiny particles called *protons* and *neutrons* also stream from the sun. These streaming particles are called the *solar winds*, and they blow throughout the solar system.

atoms to join together. This process is called *nuclear fusion*, and it creates vast amounts of energy. The energy comes out of the core in all directions as light and heat.

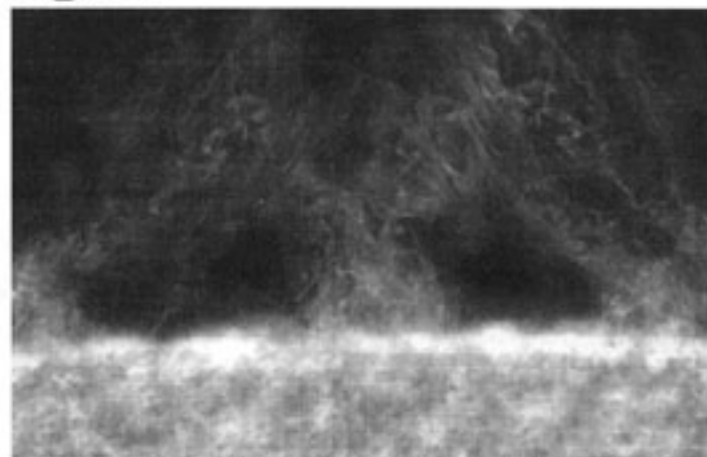
It travels through several inner layers before reaching the sun's outer layer, which is called the *photosphere*. The photosphere is the part of the sun that we see.



The photosphere is not a very pleasant place. It is a heaving, bubbling lake of fire with a temperature around 10,000 degrees Fahrenheit (5,540 degrees Celsius). But that's downright cool compared to the core, where temperatures reach 27 million degrees Fahrenheit (15 million degrees Celsius). Now *that's* hot!



Never look directly at the sun, even when you're wearing sunglasses.



Huge tongues of flame sometimes erupt from the sun's surface. These tongues are called *solar flares*.

The Sun's Life Cycle

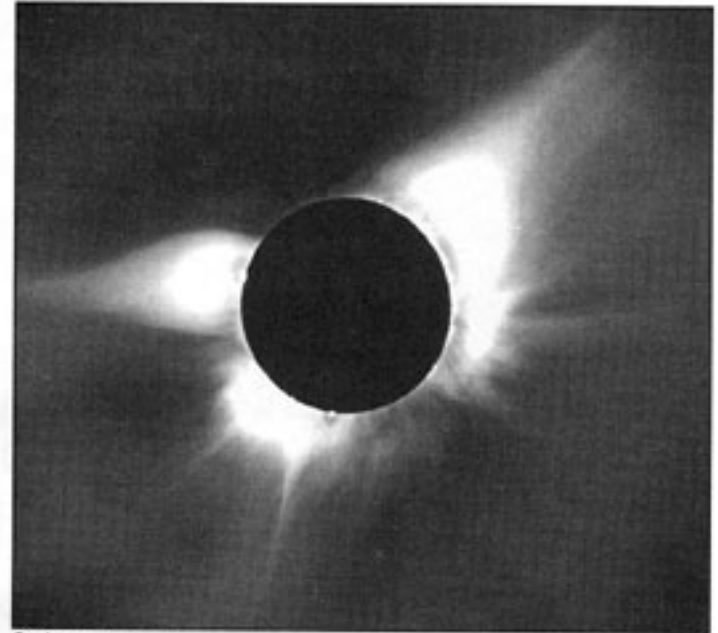
The sun will not always look the way it does today. Several billion years from now the sun will have used up most of the hydrogen "fuel" in its core. At that point the sun will start to expand, growing into a type of star called a red giant. During this period the sun will get so large that it will eat up the inner planets!

Total Eclipse of the Sun

Sometimes the moon passes directly between the sun and Earth. When this happens, the moon casts a shadow on Earth. To a person standing in the shadow, it looks like the sun is covered by a dark disk. This is called a total eclipse of the sun.

A total eclipse lasts only a few minutes. During this time, the sun's ghostly *corona* (gaseous atmosphere) can be seen. We can't see the corona at other times because the sun's photosphere shines too brightly.

Remember, *never* look directly at the sun, especially during an eclipse. The bright light could permanently damage your eyes!



Solar eclipse

After the red giant phase, the sun will begin to shrink. When it is done shrinking, the sun will be smaller and cooler than it is today. It will be a weak white dwarf, and the solar system will be a much colder and darker place.

The sun contains 99.8 percent of the matter in the solar system.