

THE SUN

A discussion of the objects in the solar system must start with the Sun. The Sun dwarfs the other bodies, representing approximately 99.86 percent of all the mass in the solar system; all of the planets, moons, asteroids, comets, dust and gas add up to only about 0.14 percent. This 0.14 percent represents the material left over from the Sun's formation. One hundred and nine Earths would be required to fit across the Sun's disk, and its interior could hold over 1.3 million Earths.

As a star, the Sun generates energy by the process of fusion. The temperature at the Sun's core is 15 million degrees Celsius (27 million degrees Fahrenheit), and the pressure there is 340 billion times Earth's air pressure at sea level. The Sun's surface temperature of 5,500 degrees Celsius (10,000 degrees Fahrenheit) seems almost chilly compared to its core temperature! At the solar core, hydrogen can fuse into helium, producing energy. The Sun also produces a strong magnetic field and streams of charged particles, the field and streams extending far beyond the planets.

The Sun appears to have been active for 4.6 billion years and has enough fuel for another five billion years or so. At the end of its life, the Sun will start to fuse helium into heavier elements and begin to swell up, ultimately growing so large that it will swallow Earth. After a billion years as a "red giant," it will suddenly collapse into a "white dwarf" - the final end product of a star like ours.

It may take a trillion years to cool off completely.

Many spacecraft have explored the Sun's environment, but none have gotten any closer to its surface than approximately two-thirds of the distance from Earth to the Sun. Pioneers 5-11, the Pioneer Venus Orbiter, Voyagers 1 and 2 and other spacecraft have all sampled the solar environment. The Ulysses spacecraft, launched on October 6, 1990, is a joint solar mission of NASA and the European Space Agency. After using Jupiter's gravity to change its trajectory, Ulysses will fly over the Sun's polar regions during 1994 and 1995 and will perform a wide range of studies using nine on-board scientific instruments.

We are fortunate that the Sun is exactly the way it is. If it were different in almost any way, life would almost certainly never have developed on Earth.

- * Apollo, the Sun god, brings life-giving heat and light.
- * The egg of creation is the symbol for the Sun.
- * The Sun formed from a huge cloud of gas 5 billion years ago.
- * The Sun (an average star) is the star nearest the Earth.
- * In ancient times, people thought the Sun was a perfect sphere or celestial fire created by the gods.
- * The Sun's energy is nuclear reaction.
- *The Sun shapes our life on Earth (the weather and the climate).
- *The Sun consists mainly of hydrogen and helium.

- * The diameter of the Sun is 864,000 miles. One million Earths could fit inside the Sun.
- * The Sun contains 99 percent of our solar system's total mass.
- * The Sun spins on its axis from left to right.
- * The Earth receives only one-billionth of the total energy output of the Sun.
- * Energy we receive from the Sun was formed 50 million years ago.
- * The Sun consists of three layers: the photosphere, the chromosphere, and the corona.
- * "Sun-spots" are giant magnetic fields that cool areas of the Sun.
- * The temperature of the Sun's core is 15 million degrees Kelvin.
- * The Sun will burn for another 5 billion years.

Source: NASA