

THE SUN

The Sun is a star located at the center of our Solar System. This huge, spinning ball of hot, glowing gases lights up Earth and provides us with heat. The Sun has a north and south pole, just like Earth, and rotates on its axis. A planet's distance from the Sun, along with its atmosphere, determines whether it can support liquid water and life as we know it. Planets very close to the Sun experience extreme temperatures, while those far away are so dark and cold that life probably cannot survive on their surfaces.

How Big Is the Sun?

The Sun is about 1.4 million kilometers (865,000 mi.) wide. If the Sun were hollow, more than a million Earths could fit inside it.

How Far Away Is the Sun?

The Sun is about 149,680,000 kilometers (93,026,724 mi.) from Earth. The Sun is so far away that its light takes about 8 minutes to reach Earth, even though light travels incredibly fast. When we see the Sun, we're really seeing what it looked like 8 minutes ago.

How Hot Is the Sun?

The temperature of the Sun can reach 5,500°C (10,000°F) on the surface and more than 15.5 million °C (28 million °F) at the core.

What Is the Sun Made Of?

Made of scorching hot gases, the Sun is approximately 74 percent hydrogen and 24 percent helium. The remainder of the Sun is made of iron, nickel, oxygen, silicon, sulfur, magnesium, carbon, neon, calcium, and chromium.

How Old Is the Sun?

The Sun formed in a huge cloud of hydrogen gas about 5 billion years ago. The gas swirled and formed a tight ball that became a star, the Sun.

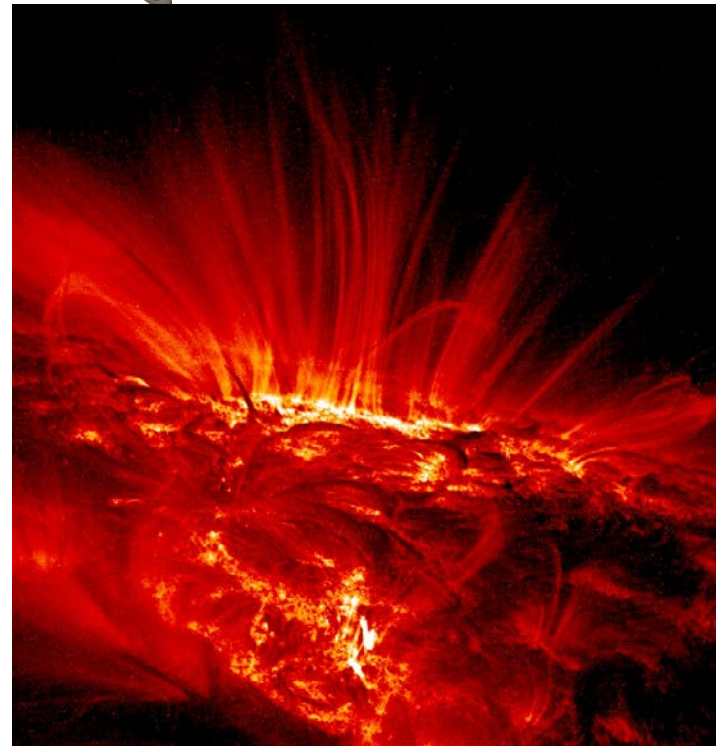
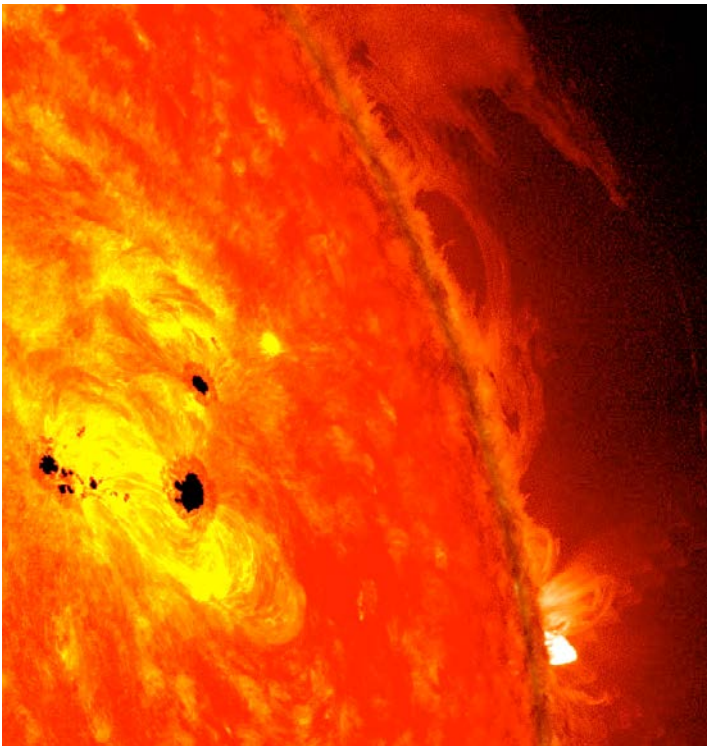


A solar flare is a strong burst of energy from the Sun. Flares can affect Earth's weather, and they can even knock out radio and satellite communications!

Do You Know?

- You would need about 4,000,000,000,000,000,000,000,000 (4 septillion) one hundred-watt lightbulbs to make as much light as the Sun.
- About 5 billion years from now, the Sun will run out of hydrogen gas and will expand and become a red giant star.
- Until about 400 years ago, most people believed that the Sun circled the Earth.
- The Greeks called the Sun Helios, and the Romans called it Sol.

Photo Credits:
Icon: composite of NASA photos; pages 1 (top right), page 1 (bottom) NASA/SDO/AIA; 2 (bottom): courtesy of NASA/SDO/GSFC; page 2 (bottom left): courtesy of NASA/SDO/AIA; page 2 (top left): courtesy of NASA/SDO/AIA/HMI/GSFC; page 2 (top right): courtesy of GSFC



Scientists use special cameras to study the Sun. By understanding the Sun, it helps them understand other stars beyond our Solar System. It also helps them learn how changes in the Sun, such as

sunspots and solar flares, affect Earth. Sunspots occur when the Sun's magnetic field rearranges itself, and they often lead to solar flares. This sunspot is large enough that six Earth's could fit inside it!

Core

The fusion of hydrogen happens here.

Radiation Zone

The energy created from the fusion in the core is passed from atom to atom through this zone. Because it's so hot, atoms cannot store energy. It can take more than 170 thousand years for the energy to pass through this zone.

Convection Zone

Because it is cooler in this zone, atoms are actually able to hold on to the energy. The hotter material nearer the radiation zone rises to the top, releases energy, cools, and sinks back down.

Photosphere

This is the surface of the Sun we can actually see. After hundreds of thousands of years, the energy is finally released in various forms, including heat and visible light.

Corona

This is a huge field of energy coming out of the sun. It can only be seen during a solar eclipse, but it's always there. For reasons scientists don't understand, the corona is actually much hotter than the surface of the Sun, and can reach more the 2 million°C (3.6 million°F).

How the Sun Formed

The Sun formed about 4.5 billion years ago from a cloud of gas and dust. The force of gravity pulled it all together into a massive ball. The hydrogen gas at the center was under more and more pressure, which made the temperature hotter and hotter. The hydrogen, which makes up about 70 percent of the Sun, began to react, coming together in a process called fusion to create helium. Fusion creates energy, and trillions of hydrogen atoms fusing creates incredible energy. This process has continued for billions of years.

