

FREQUENTLY ASKED QUESTIONS ABOUT THE SUN

What is the Sun?

A star: An intensely hot ball of gas that is held together by its own gravity and shines as a result of converting hydrogen gas to helium in its core.

Why is it important?

The Sun is the primary source of energy for Earth's global ecosystem. It makes life possible and governs Earth's overall climate.

How far away is it?

About 93,000,000 miles (150,000,000 km). It takes light about eight minutes to travel from the Sun to Earth.

How hot is it?

It's hot! The surface is about 10,000 degrees Fahrenheit (almost 6,000 degrees Kelvin). The core, where the reactions are going on, is even hotter at about 28 million degrees Fahrenheit (about 15 million degrees Kelvin).

How big is it?

Its diameter is about 860,000 miles (1,400,000 km), which is just about 108 times bigger than Earth.

What is it made of?

- 75% hydrogen
- 23% helium
- 1% carbon and oxygen
- 1% all other elements

How long will it shine?

The Sun has been shining for about 5 billion years, and will shine for another 7 billion years before it uses up all its hydrogen fuel and burns out.

How does it shine?

The Sun gets its primary source of energy when it converts hydrogen gas to helium, a process known as *thermonuclear fusion*. The temperature and pressure in

the Sun's core are so great that four hydrogen nuclei collide and fuse into one helium nucleus. This reaction releases energy (light), which streams out from the core of the Sun and emerges from its atmosphere, making it shine and keeping it from collapsing as it is pulled on by its own gravity.

How does it affect me?

Eruptions in the Sun's atmosphere, called solar flares, send streams of intense energy and electrically charged particles into Earth's atmosphere, causing aurorae (the northern and southern lights) and occasionally disrupting radio communications. Small, long-term changes in the Sun's energy output may be partly responsible for global warming. (Human effects, such as pollution, may also be responsible.) Solar flares can be powerful enough to affect Earth's weather by warming our atmosphere more than usual.

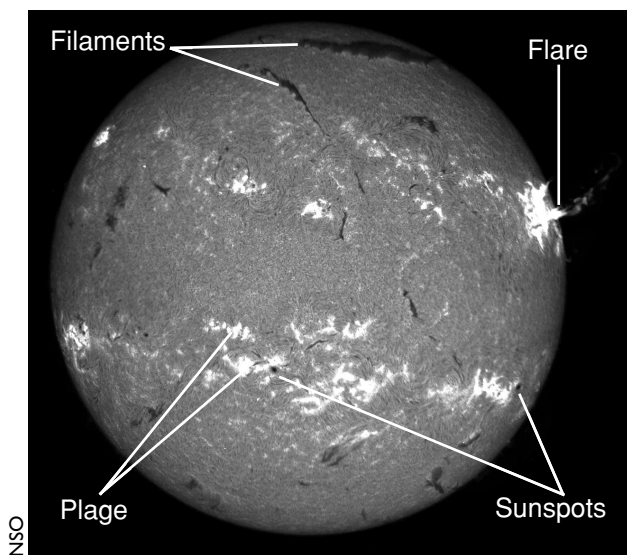
What are sunspots?

Sunspots are regions of the photosphere where the magnetic field is very strong. Sunspots appear darker than their surroundings in almost all kinds of observations because they are a few thousand degrees cooler than their surroundings, and because they are fairly big. Sunspots range in diameter from about 1,500 miles (about 2,500 km) to more than 30,000 miles (about 50,000 km). A sunspot is roughly circular in shape, though some have very irregular shapes.



If you have questions about the Sun, visit Mr. Sunspot at:

<http://www.sunspot.noao.edu/PR/answerbook.html>. You will find an archive of answers to frequently asked questions.



This photo was made at the National Solar Observatory and it shows a variety of features on the Sun.

Plage represents regions of the atmosphere that are being heated. **Sunspots** result from extremely strong concentrations of magnetic field that suppress the flow of energy in these regions.

Prominences are bright loops seen extending above the edge of the solar disk into the outer atmosphere. When seen against the solar disk, prominences appear as dark bands called **filaments**. When filaments or prominences become unstable, they can erupt leading to the ejection of mass and magnetic field from the Sun and turn into solar **flares**.

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