

The Solar System

The Sun

Guide for Reading

- What are the three layers of the sun's interior?
- What are the three layers of the sun's atmosphere?
- What features form on or above the sun's surface?

The sun's mass is 99.8 percent of all the mass in the solar system. Because the sun is so large, its gravity is strong enough to hold all of the planets and other distant objects in orbit.

Unlike Earth, the sun does not have a solid surface. Like Earth, the sun has an interior and an atmosphere. **The sun's interior consists of the core, radiation zone, and convection zone.** Each layer has different properties.

The sun produces an enormous amount of energy in its **core**, or central region. The sun's energy comes from nuclear fusion. In the process of **nuclear fusion**, hydrogen atoms in the sun join to form helium.

The light and heat produced by the sun's core first pass through the middle layer of the sun's interior, the radiation zone. The **radiation zone** is a region of very tightly packed gas where energy is transferred mainly in the form of electromagnetic radiation.

The **convection zone** is the outermost layer of the sun's interior. Hot gases rise from the bottom of the convection zone and gradually cool as they approach the top. Cooler gases sink, forming loops of gas that move heat toward the sun's surface.

The sun's atmosphere consists of the photosphere, the chromosphere, and the corona. The inner layer of the sun's atmosphere is called the **photosphere**. *Photo* means "light," so the photosphere is the sphere that gives off visible light.

At the beginning and end of a solar eclipse, you can see a reddish glow around the photosphere. This glow comes from the middle layer of the sun's atmosphere, the **chromosphere**. *Chromo* means "color," so the chromosphere is the "color sphere."

During a total solar eclipse, a fainter layer called the **corona** is visible. The corona sends out a stream of electrically charged particles called **solar wind**.

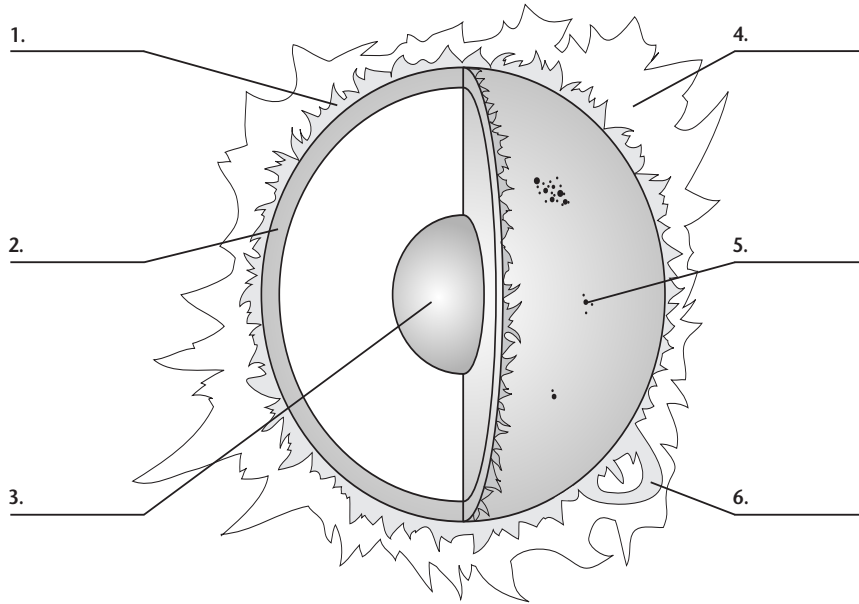
Features on or above the sun's surface include sunspots, prominences, and solar flares. **Sunspots** are areas of gas on the sun that are cooler than the gas around them. Sunspots usually occur in groups. Reddish loops of gas called **prominences** link different parts of sunspot regions. Sometimes the loops in sunspot regions suddenly connect, releasing large amounts of energy. The energy heats gas on the sun to millions of degrees Celsius, causing the gas to explode into space. These explosions are known as **solar flares**. Solar flares can greatly increase the solar wind.

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Understanding Main Ideas

Label the diagram of the sun below.



Building Vocabulary

Match each term with its description by writing the letter of the correct description in the right column on the line next to the term in the left column.

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|-------------------------|--|
| ___ 7. solar flare | a. the layer of the sun's atmosphere that gives off visible light |
| ___ 8. core | b. the layer of the sun's atmosphere that has a reddish glow |
| ___ 9. chromosphere | c. the layer of the sun's atmosphere that looks like a halo during an eclipse |
| ___ 10. sunspot | d. areas of gas on the sun's surface that are cooler than the gases around them |
| ___ 11. corona | e. reddish loops of gas that link parts of sunspot regions |
| ___ 12. nuclear fusion | f. eruptions that occur when the loops in sunspot regions suddenly connect |
| ___ 13. photosphere | g. a stream of charged particles produced by the corona |
| ___ 14. solar wind | h. the center of the sun |
| ___ 15. prominence | i. the outermost layer of the sun's interior |
| ___ 16. radiation zone | j. the joining of hydrogen atoms to form helium |
| ___ 17. convection zone | k. the layer of the sun's interior where energy is transferred mainly by electromagnetic radiation |