
Our Sun

The Sun

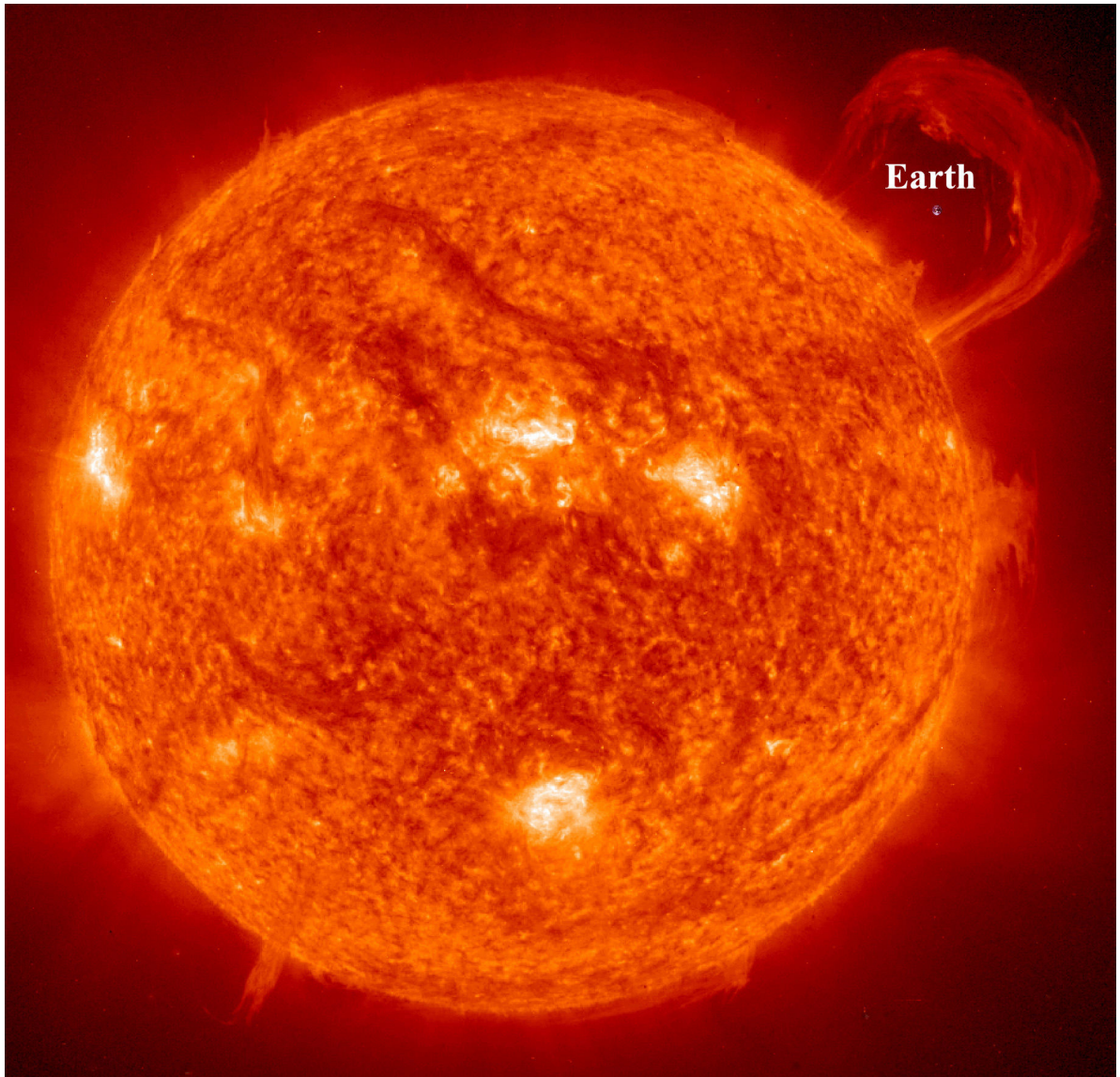
- Is a star
- Made of gases
- Is our primary source of energy

How Big is the Sun?

About 110 times wider than Earth

Or

1.3 million times bigger than Earth



LAYERS OF THE SUN

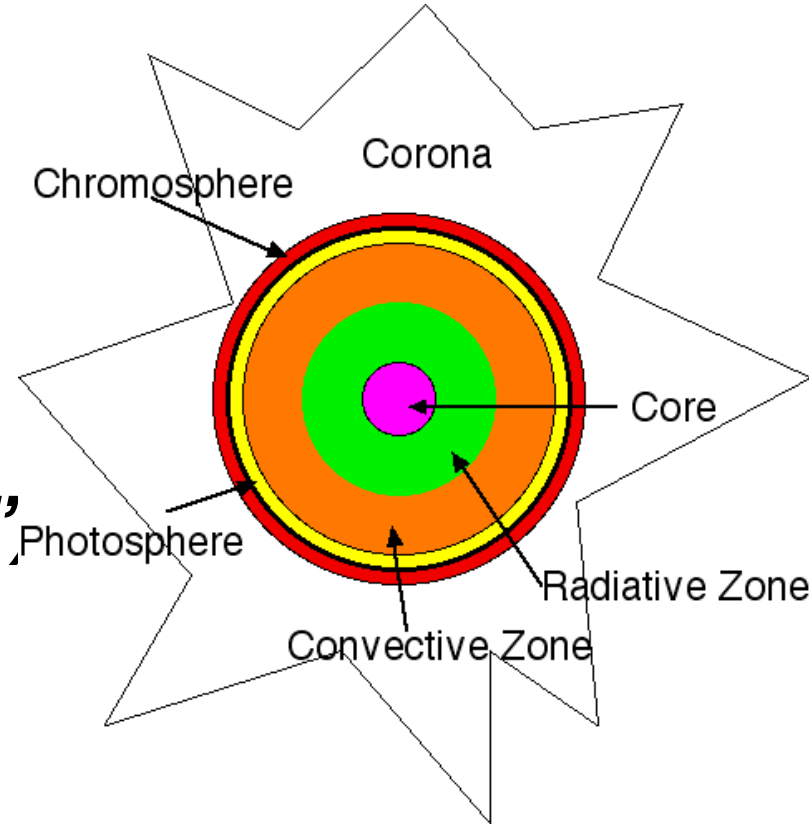
- **Major Regions:**

Interior ("Inner-sphere")

- Core
- Radiative Zone
- Convective Zone

Atmosphere ("Outer-sphere")

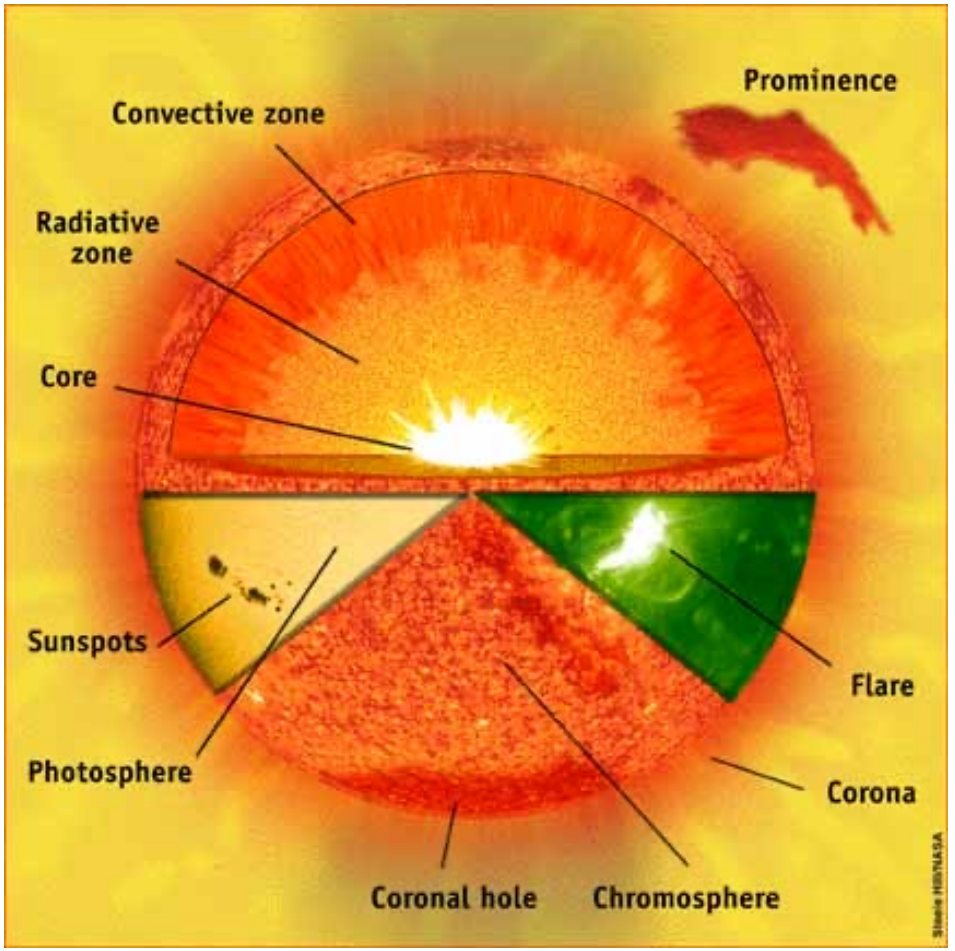
- Photosphere
- Chromosphere
- Corona



No real "surface" - it is gaseous all the way to the center!

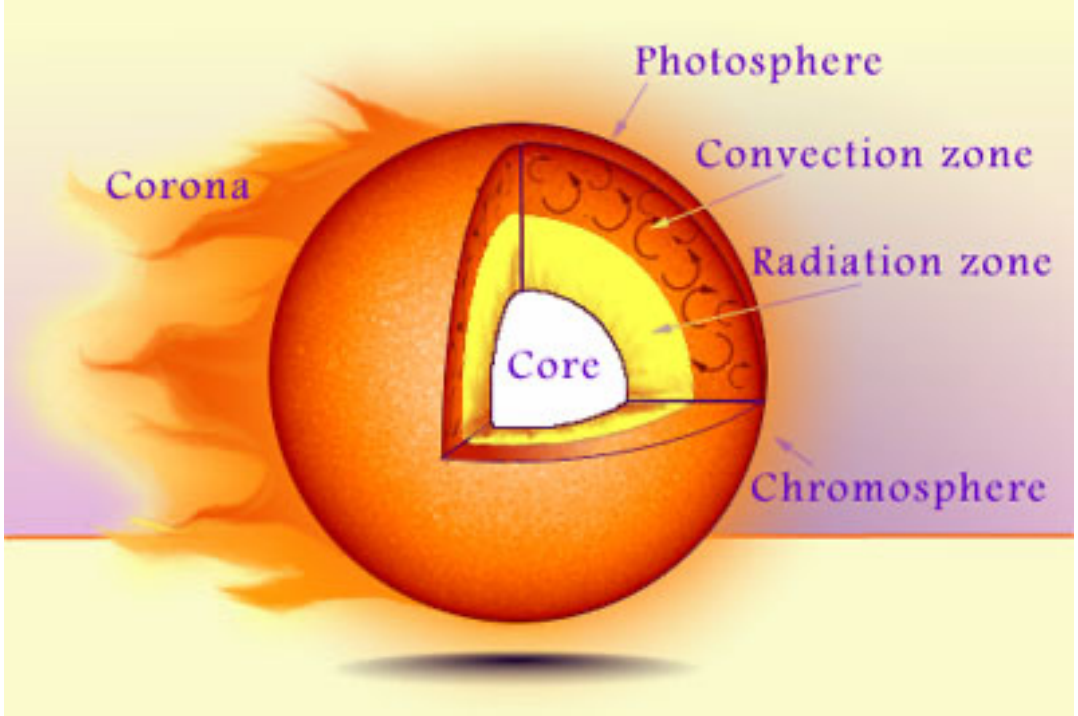
What is the hottest portion/part of the sun?

- **<u>The CORE</u>**!
- Location of Sun's energy generation by nuclear fusion.
- 27 million degrees Farenheit



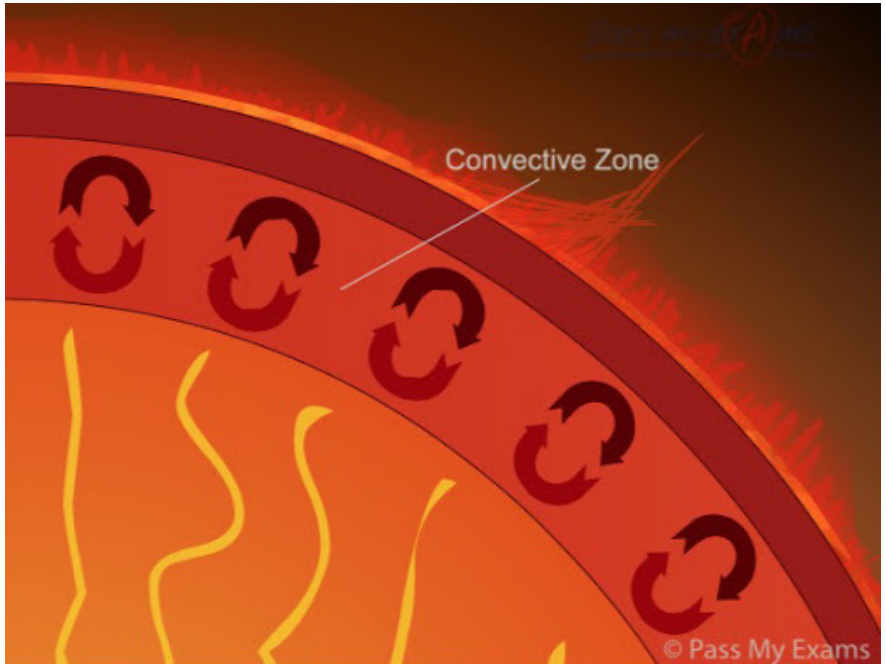
Radiation zone

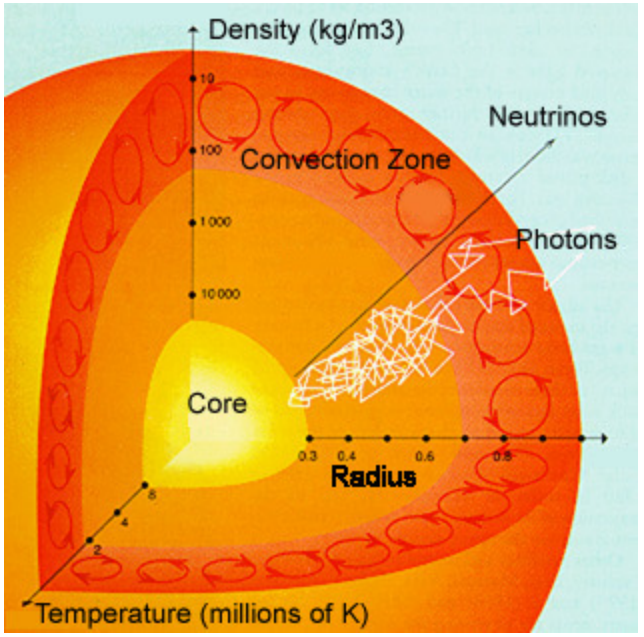
- **The radiation (radiative) zone of the solar interior is characterized by the process of radiation.**



Convection Zone

- The convection zone is a region of the Sun where hot and cooler gases circulate in convection currents.





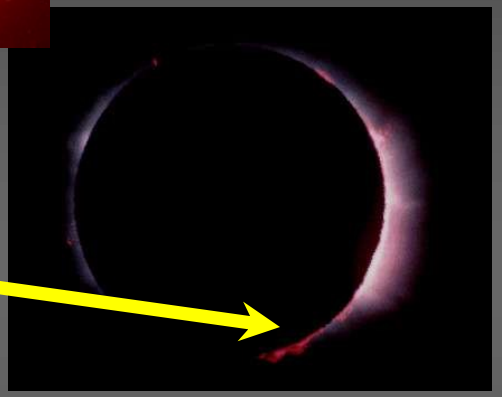
The Sun's Atmosphere

Photosphere 9,900 degrees F

- makes light
- the most prominent layer

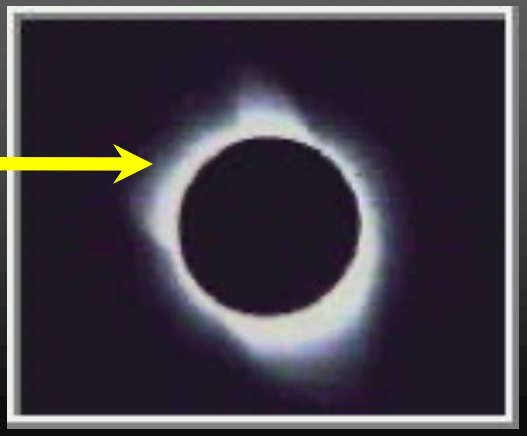
Chromosphere 18,000 degr F

- thin middle layer; gives off reddish light when the photosphere is blocked during a total eclipse

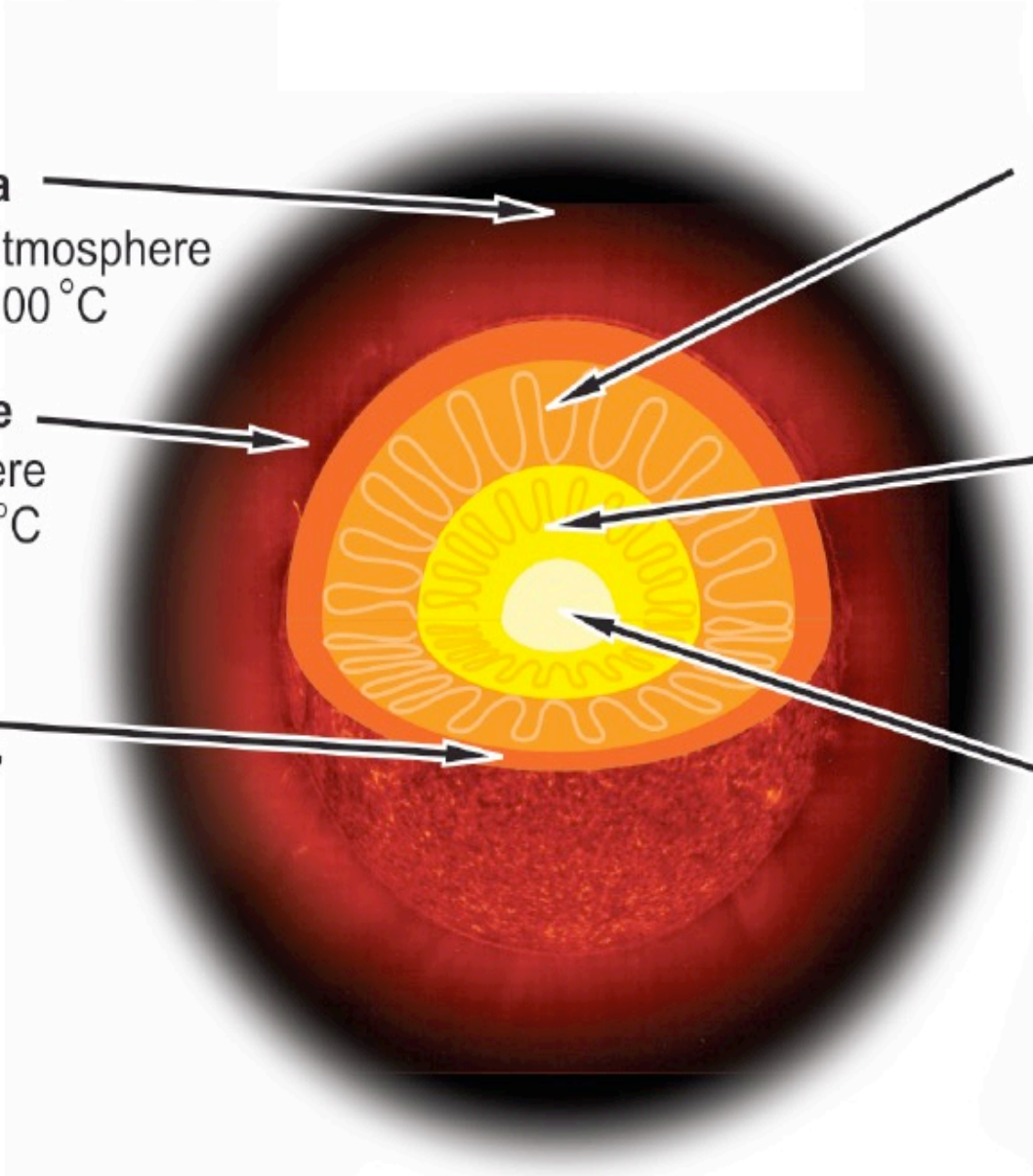


Corona 3,600,032 F

- outer layer of the atmosphere
- can be seen during a total eclipse
- looks like a white halo



Sun Anatomy



Corona
Outer atmosphere
2,000,000 °C

Chromosphere
Inner atmosphere
5,000 - 10,000 °C

Photosphere
visible "surface"
5,500 °C

Convection zone
Heat transfer through
motion of hot gas

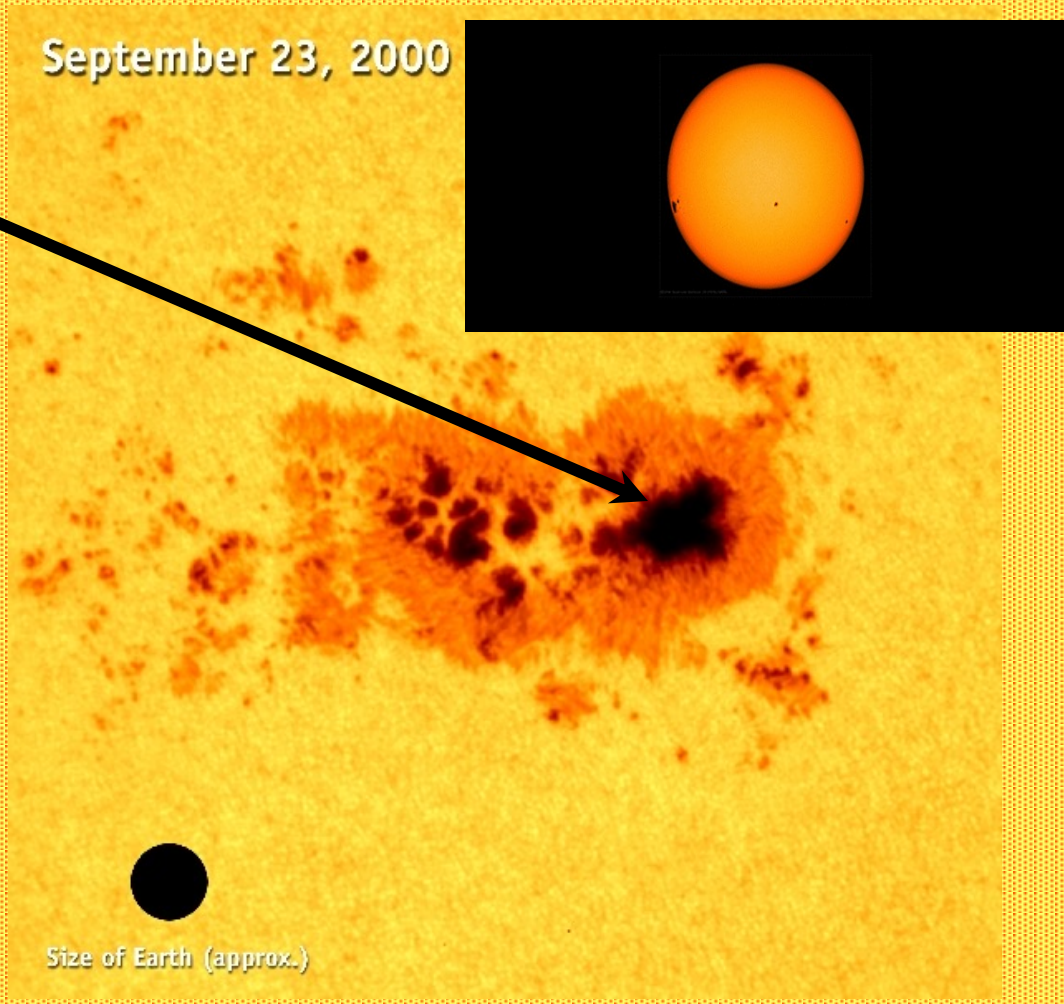
Radiation zone
Heat transfer mainly
through light energy

Core
Nuclear fusion

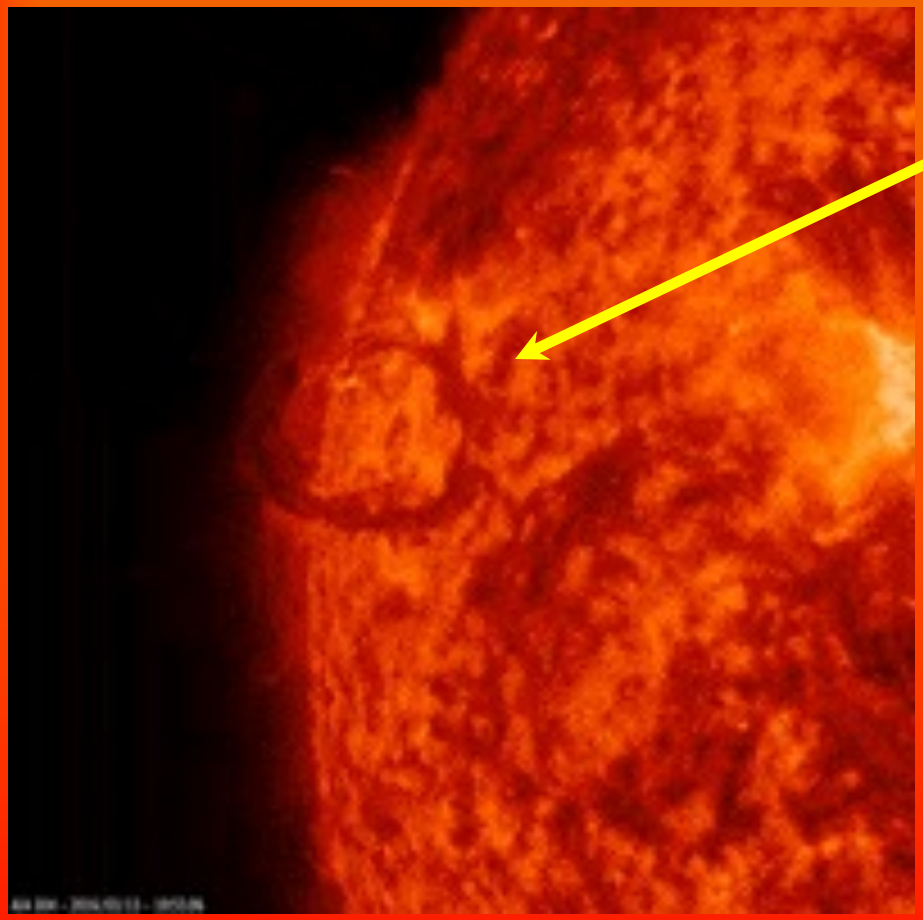
Features of the Sun

Sunspots

- Areas of gas that are cooler than surrounding gases
- Do not give off as much light
- Appear as dark spots on the Sun



Features of the Sun



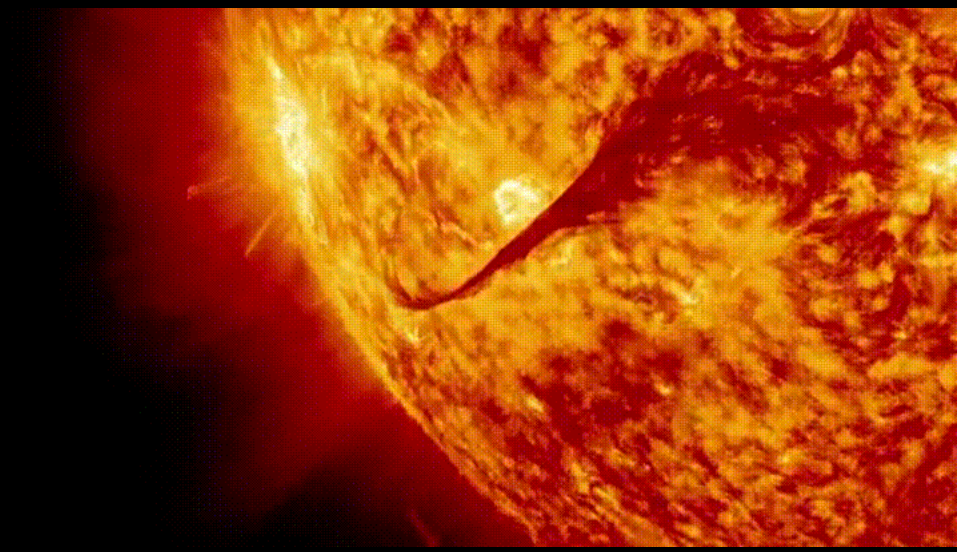
Prominences

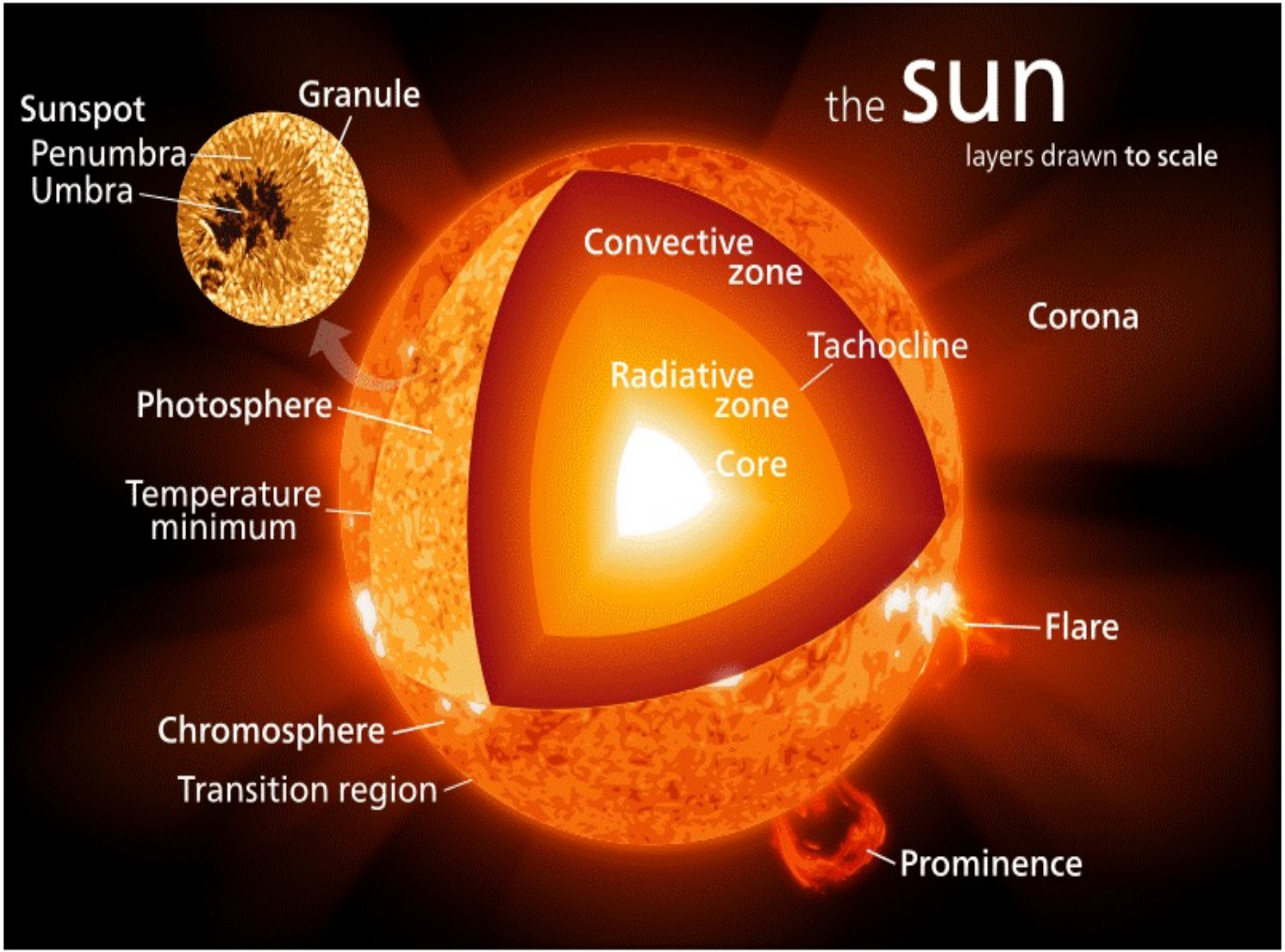
- Huge looping eruptions of gas
- Usually near sunspots
- Arch out into the outer layers of the sun's atmosphere

Features of the Sun

Solar Flares

- Explosions of hot gas that occur near sunspots
- Shoot from Sun's surface releasing tremendous amounts of energy (equivalent to millions of hydrogen bombs)
- Largest explosions in the solar system




the sun
layers drawn to scale
Sunspot
Granule
Penumbra
Umbra
Convective zone
Corona
Tachocline
Radiative zone
Photosphere
Core
Temperature minimum
Flare
Chromosphere
Transition region
Prominence

The Sun's Affect on Earth

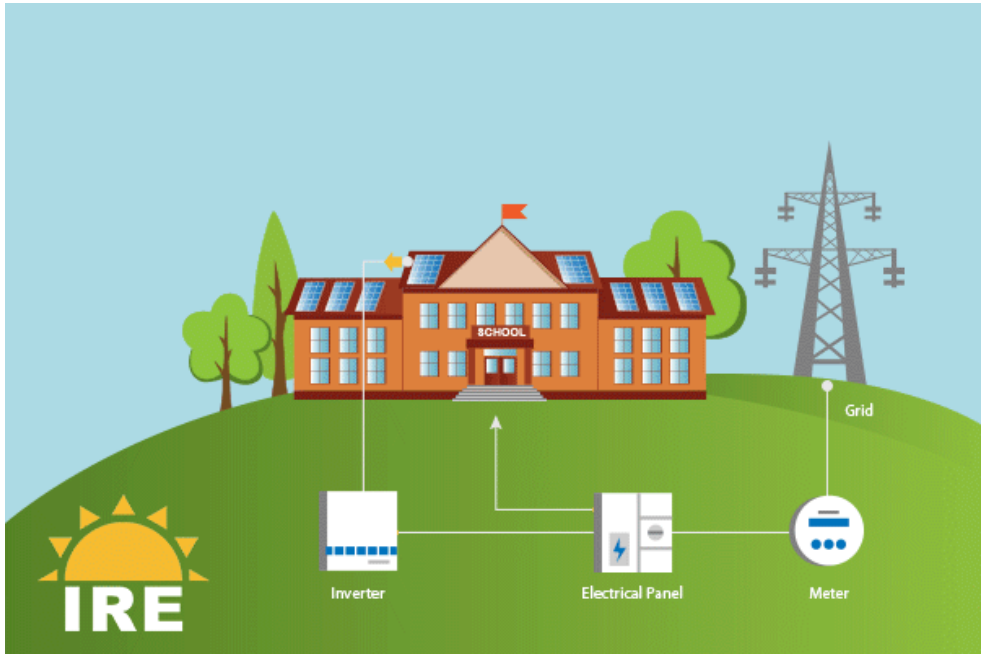
- Some of the light and heat radiated from the sun reaches Earth.
- It is either reflected, scattered or absorbed.

Features of the sun

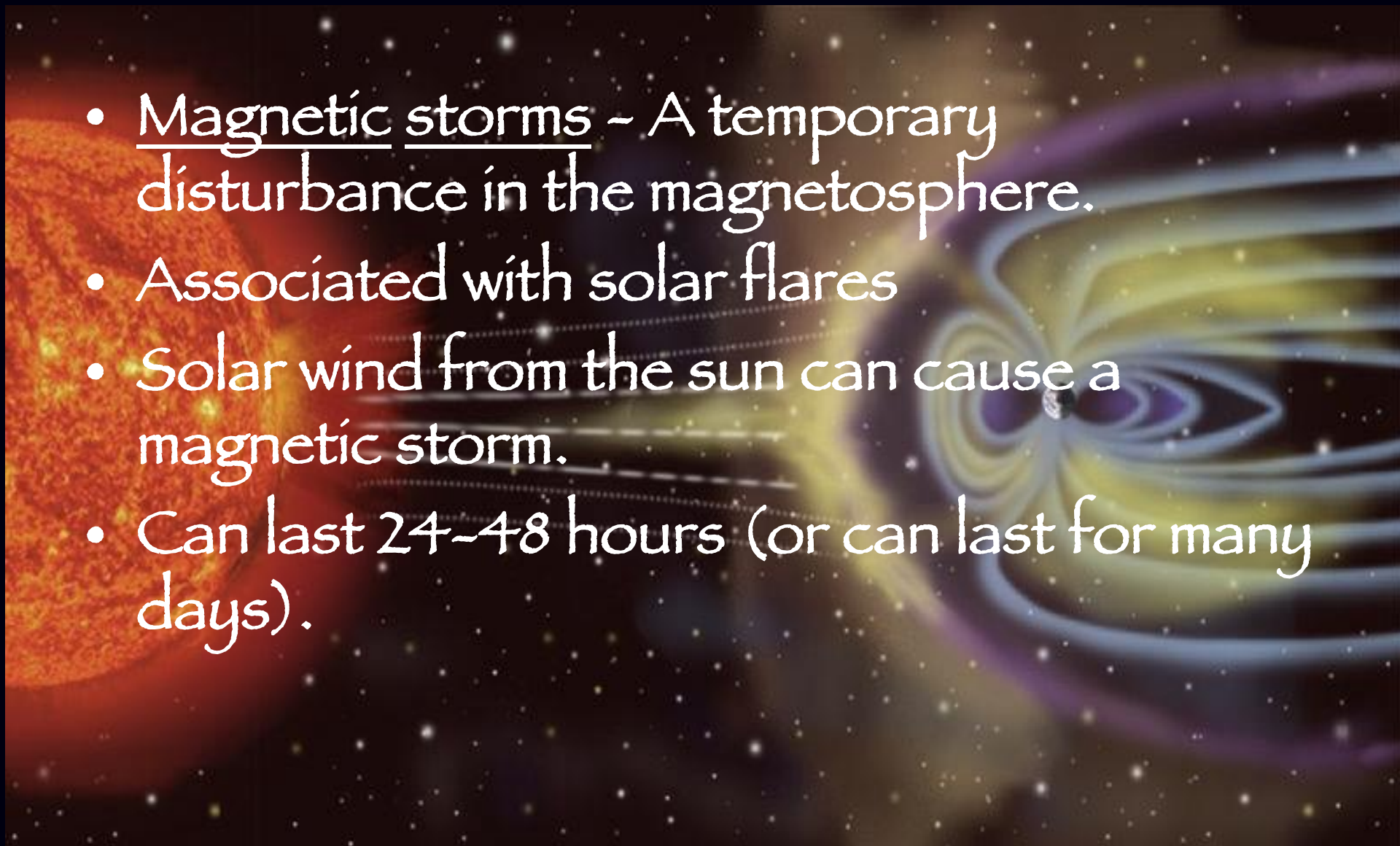
- *Solar wind* is an electrically charged mixture of protons and electrons that cause magnetic storms.
- *Auroras*, called the northern lights, occur when layers of our atmosphere are energized by solar winds.

Solar energy

- *Solar energy* is a term that refers to radiant energy from the Sun.
- The radiant energy of the Sun reaches Earth in the form of electromagnetic waves.
- We can use solar energy to heat buildings and generate electricity.



The Sun's Effect on Earth



- Magnetic storms - A temporary disturbance in the magnetosphere.
- Associated with solar flares
- Solar wind from the sun can cause a magnetic storm.
- Can last 24-48 hours (or can last for many days).

Effects of Magnetic Storms

- Long-range radio communication can be difficult or impossible.
- Global Positioning Systems can be ruined.
- Satellite orbits can be difficult to control.
- Electric-power grids can experience voltage surges and cause blackouts.
- Astronauts and high altitude pilots can be subjected to increased levels of radiation.