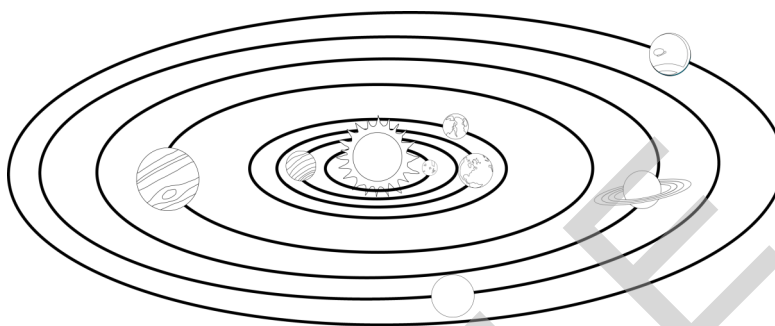
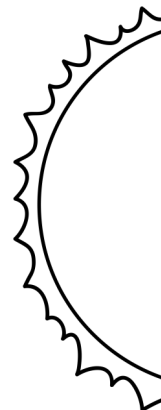


# Earth's Sun and Moon and Their Patterns

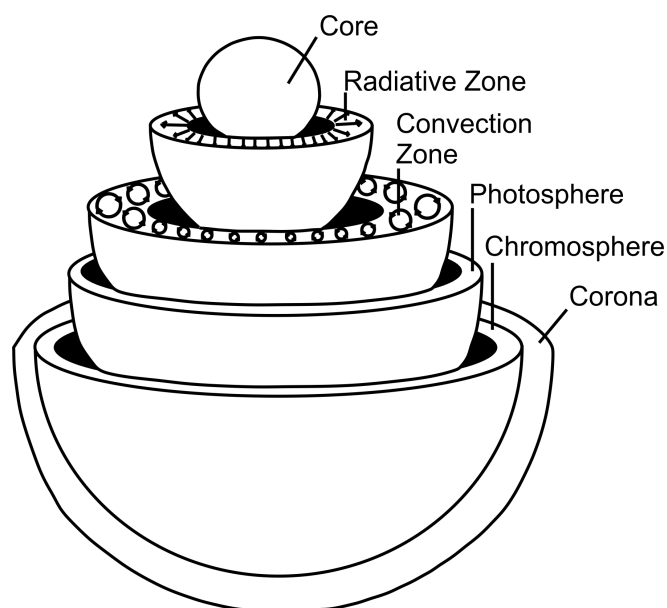
No matter where you are on the Earth, there are two things you can see in the sky at some point during the year—the sun and the moon. They may look different at different times of the year, and some places can go weeks without seeing the sun, but if it weren't for these two objects, we wouldn't have life as we know it on Earth. We're going to see what we can find out about these two heavenly bodies, learn about what they do, and see how they affect us on planet Earth.



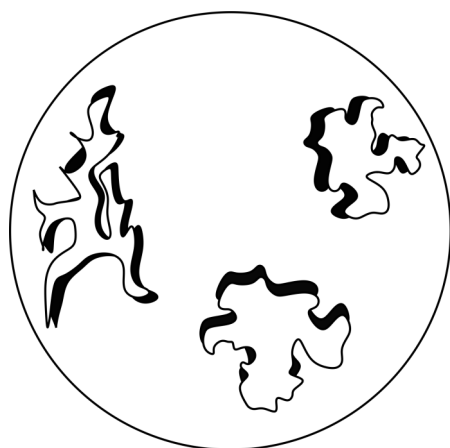
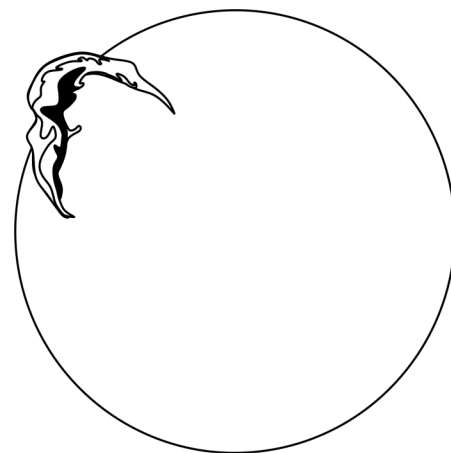
The sun is at the center of our solar system. The planets, plus asteroids and comets, revolve around the sun. It gives Earth the light, heat, and other energy living things need to survive, even though it is about 93 million miles (149 million kilometers) away. If we were even 5% of the distance closer, it would cook our oceans and kill everything on Earth. If we were 5% farther away, we would freeze.

The sun doesn't have a crust like we have on the Earth. The sun is made of gas. Most of this gas is sensitive to magnetism, making it a special kind of gas called **plasma**. We'll learn more about why this magnetism is important in a little bit. Even though the sun doesn't have a crust, it does have layers, and that's where we're going to start.

The interior of the sun has three layers—the core, the radiative zone, and the convection zone. The sun's atmosphere also has three layers—the photosphere, the chromosphere, and the corona. Since obviously we have never been able to visit the sun, there are things about the sun scientists can't be sure of. They've had to observe and study what we can know to try to understand what we can't know for sure.

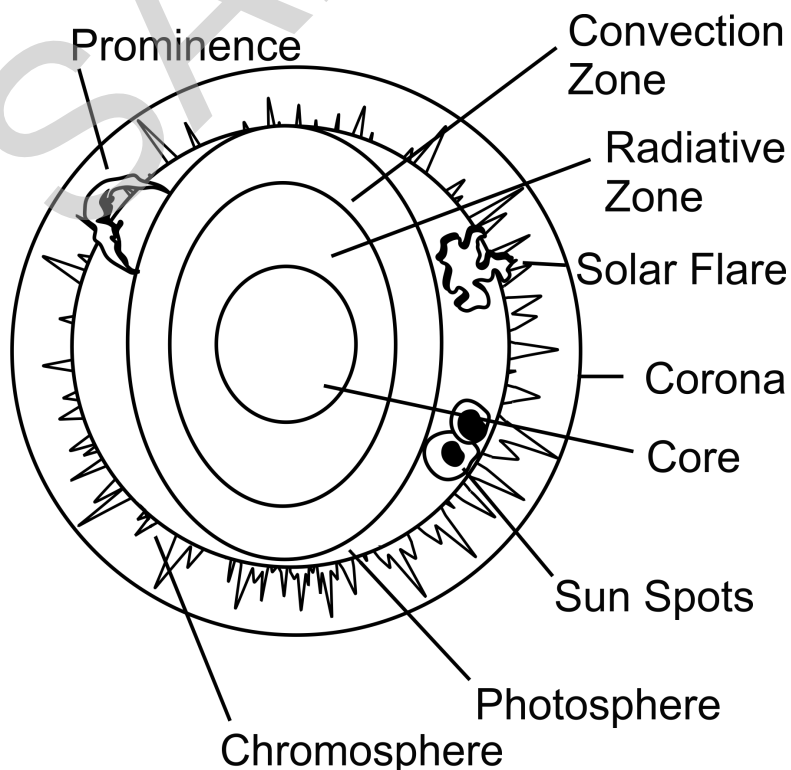


Sometimes, dense threads of gas erupt into the corona. When this happens and the threads reach outside the edge of the sun, it's called a **prominence**. A single prominence can be several thousand miles or kilometers wide and long, and it can change shape many times. Scientists aren't sure what causes prominences to form, but they think it involves magnetic forces in the sun.

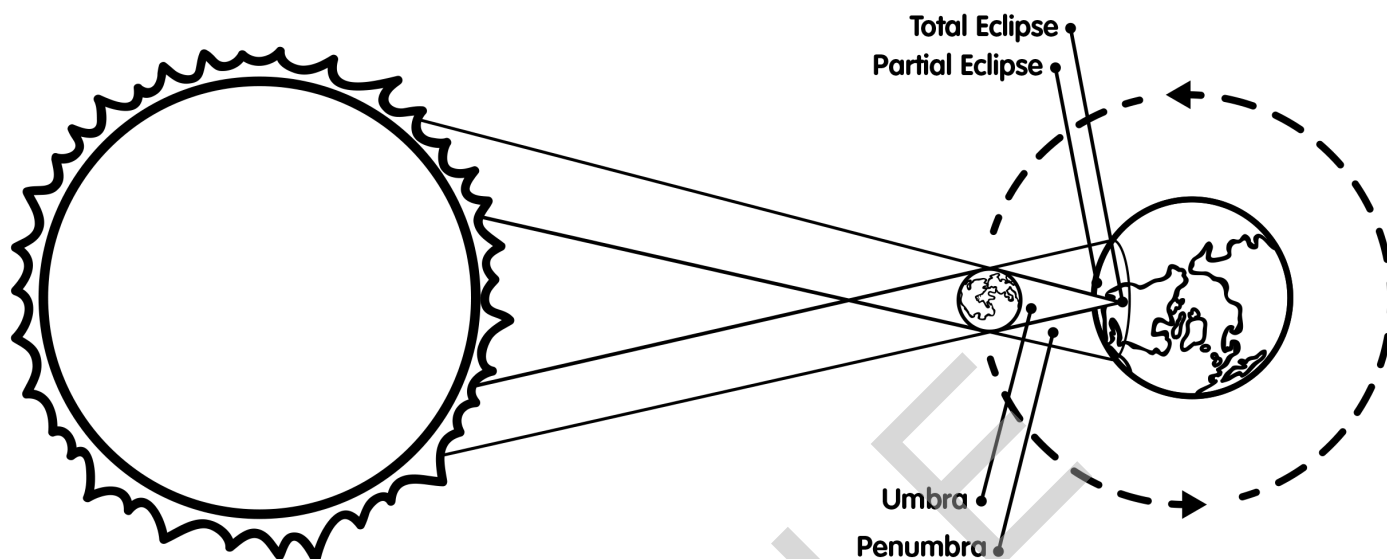


Sometimes, part of the sun's atmosphere will suddenly get very bright and superheat part of the sun's corona. This is a **solar flare**, and scientists think the flares are also caused by the magnetic fields of the sun. A solar flare gives off radio waves, which can disrupt signals on Earth. The flare goes through two phases. First, it goes through a rise phase when its temperature increases. Then the temperature goes back to normal during the decay phase.

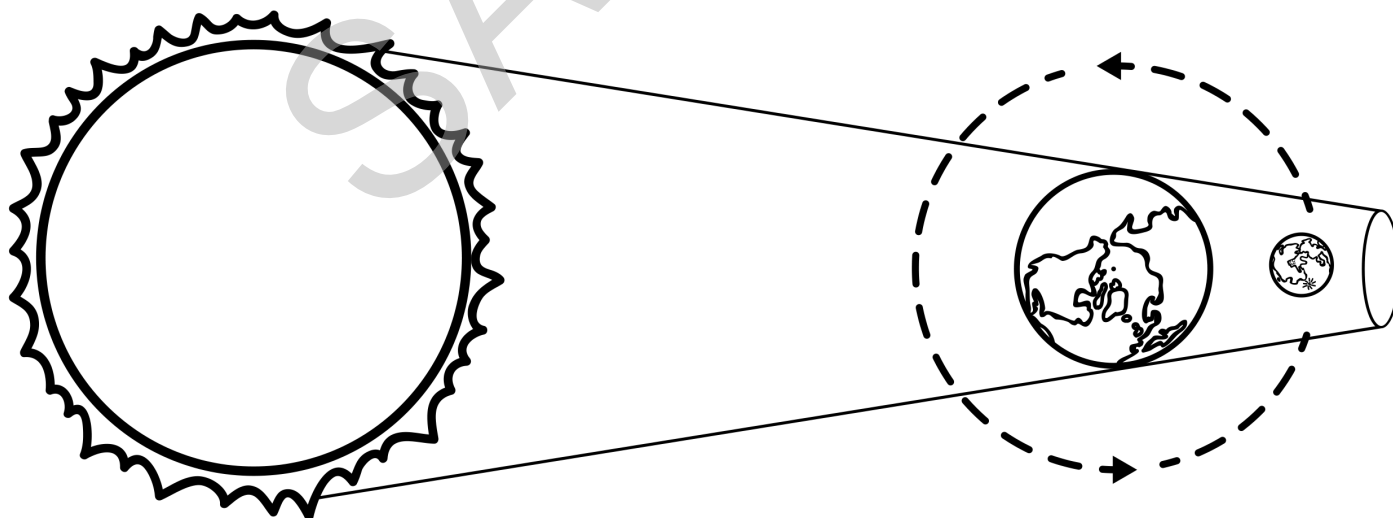
That's a lot of parts to remember! Let's put them all together so we can see them all at one time.



But in every solar eclipse, there is a narrow band on the Earth where the moon totally eclipses the sun for a few seconds or even a few minutes. This strip is called the **path of totality**, and what you can see from here is called a total eclipse. The shadow that blocks all the light is called the **umbra**.



A **lunar eclipse** happens when the moon travels through the shadow of Earth. When the whole moon goes through the shadow, it's called a total eclipse. When only part of the moon goes through the shadow, it's called a partial eclipse. The moon never goes all the way dark during a lunar eclipse, though. The moon just looks darker, and sometimes it looks redder than usual because of the way the light that is reaching us bends. Instead of only being able to be seen by a few people, everyone on one side of the Earth can see a lunar eclipse when it happens.



So the next time you think you are sitting perfectly still, remember that you are actually spinning around and around, rotating with the Earth around its axis and orbiting around the sun all at the same time! That's a lot of movement!

# Terminology

Using what you learned, define these words in the best way you can. Use the back of the page if you need more room.

Plasma: \_\_\_\_\_

Conduction: \_\_\_\_\_

Radiation: \_\_\_\_\_

Convection: \_\_\_\_\_

Photosphere: \_\_\_\_\_

\_\_\_\_\_

Solar wind: \_\_\_\_\_

Sunspots: \_\_\_\_\_

\_\_\_\_\_

Prominence: \_\_\_\_\_

Solar flare: \_\_\_\_\_

\_\_\_\_\_

Exosphere: \_\_\_\_\_

Craters: \_\_\_\_\_

\_\_\_\_\_

Basin: \_\_\_\_\_

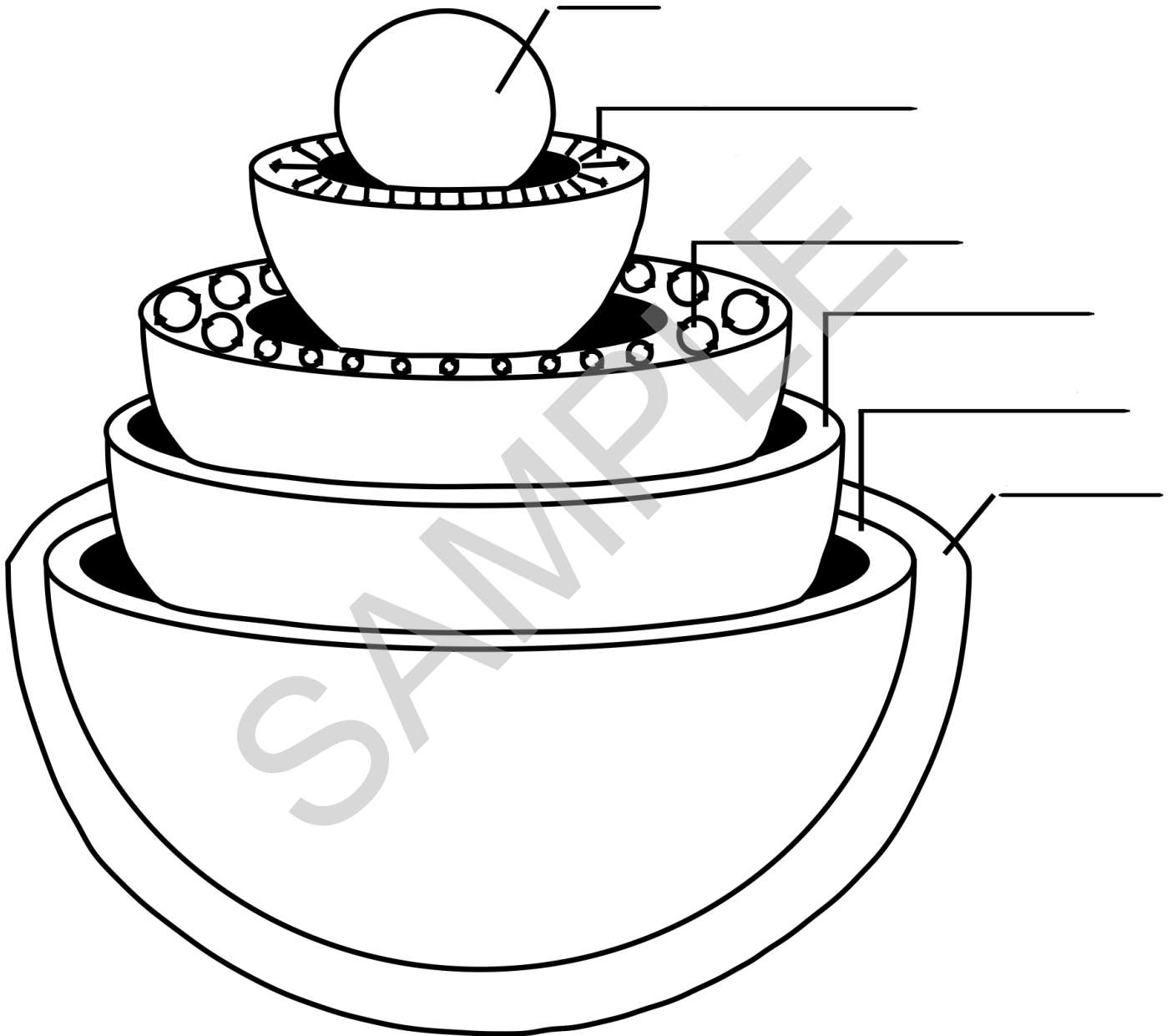
Lunar mountains: \_\_\_\_\_

\_\_\_\_\_

Maria: \_\_\_\_\_

## Review

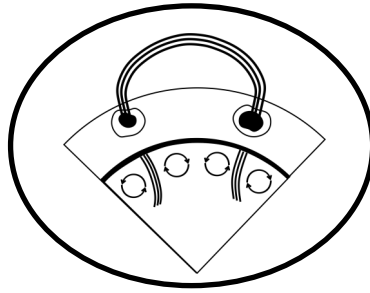
Label the layers of the sun on the first diagram. Next, label the layers again in the second diagram and also label some of the types of activities on the sun that we learned about.



Which of the following is a dark spot on the sun? Draw a circle around it.



Prominence

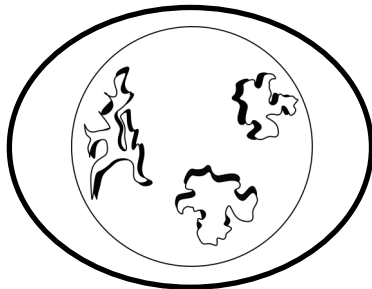


Sunspot

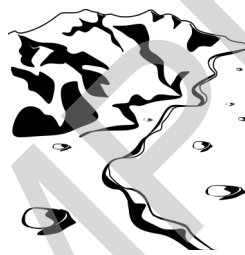


Maria

Which of the following is when part of the sun's atmosphere suddenly gets very bright and superheats part of the sun's corona? Draw a circle around it.



Solar flare



Rilles



Prominence

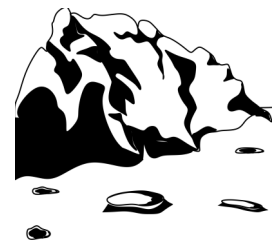
Which of the following are the dark areas formed by lava that cools in a crater? Draw a circle around it.



Rilles



Maria



Lunar mountains

Can you name four of the eight phases of the moon?

Any four of the following: new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, third quarter, waning crescent