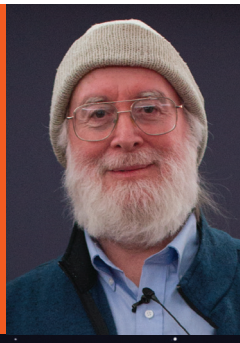
PREPARE FOR THE ECLIPSE WITH DR. LAURANCE DOYLE



Dr. Laurance Doyle's tips for viewing the April 8 eclipse. Join him on Tuesday, April 2, for a pre-eclipse webinar. Register at ***principia.edu/eclipse****.*

ECLIPSE TERMS

The **Sun**, our home star, is a dwarf star. Its diameter is about 109 times the diameter of Earth. The Sun is about 80 billion hydrogen bombs exploding every second. The sunshine we're getting now was made inside the Sun a million years ago—that is, it took a million years to get to the surface.

Solar eclipses are probably the most dramatic, safe thing that nature does. A solar eclipse happens when the Moon goes in front of the Sun. The Moon is 1/400th the size of the Sun, and right now, even though it's moving out about an inch a year, the Moon happens to be 1/400th the distance between the Earth and Sun, so it fits perfectly over the Sun. During a solar eclipse, you can see the **corona**—the Sun's atmosphere—which is made up of high-energy electrons.

Lunar eclipses—which occur when the Moon goes into Earth's shadow—are easier to see than solar eclipses. Solar eclipses occur more often than lunar ones, but it's rarer to see them because the shadow of the Moon is so small.

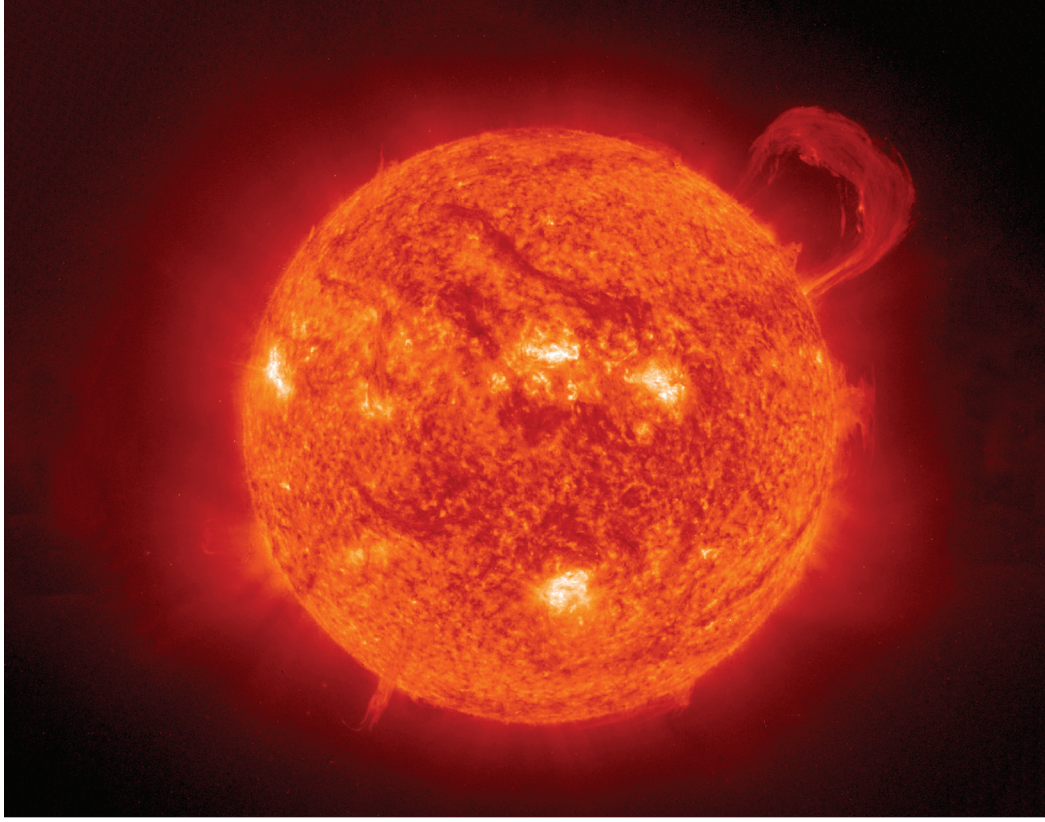
WHAT TO LOOK FOR

Before the eclipse takes place, you'll see little **crescents** on the ground. These are formed by the leaves, which act as little pinhole cameras.

Discovered in 1836, **Bailey's Beads** appear around the Moon just before totality. They're caused by the Sun shining through the valleys of the Moon. Each of the beads is a valley—

31.5 million

The number of people who live within the path of totality on April 8



2044

The next time a total solar eclipse will take place in the contiguous U.S.

9,190

The total length of the April 8, 2024 eclipse path in miles

Top: A handle-shaped solar prominence flies off the Sun's surface in this photo taken on 9/14/1999.

while the Moon is blocking the Sun, the valleys are letting through some of the sunshine.

Just before the Sun disappears, you can see something called the **Diamond Ring Effect**. (It's okay to take a picture of this as long as you're not looking through optics. Fortunately, most people have digital cameras now, so they can look at the LCD.)

First noted by Carl Goldschmidt in 1816, **shadow bands** occur when the Moon is starting to cover the Sun. These are fluttering shadows due to atmospheric scintillations (turbulent air cells) making the crescent Sun sparkle. The turbulent cells closest to you start the twinkling, and then as the Sun's crescent gets narrower and narrower, the cells from the jet stream cause the flickering to speed up.

Look for the **Moon's shadow** zooming at you, moving across the landscape at about 1,000 miles an hour. You'll see it coming, and then suddenly it will get cold, and all the animals will go to sleep. Stars will come out, and there will be a gold glow around the horizon. The **Emerald Tiara** looks like an emerald halo around the Moon as the Moon goes across the Sun. It's an atmospheric refraction phenomenon especially visible during eclipses near the horizon. (Dr. Doyle discovered the Emerald Tiara in 2002.)

During totality, you'll see **solar prominences**, twisted magnetic field lines on the Sun that cause curling hot plasma to fly off the surface. You'll also see **solar flares**, another phenomenon of the hotter interior of the Sun exploding on the surface.

The **solar chromosphere** is the thin surface layer of the Sun just over the photosphere. Basically, it's the skin of the Sun, and it flashes mostly green. You can see it in the flash spectrum taken during solar eclipses.