

# JOURNEY TO THE SUN



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**YOU WOULD THINK** that we'd know everything there is to know about the sun — that giant ball of gas at the center of our solar system. Life couldn't exist without it! Nope: Scientists have lots more to learn. That's the mission of NASA's Parker Solar Probe, which became the first spacecraft to enter the outermost layer of the sun's atmosphere, called the corona, last spring. Making something that wouldn't burn to a crisp was challenging, says Nour Raouafi, an astrophysicist at the Johns Hopkins Applied Physics Laboratory, which created the probe: "Almost everything had to be invented or custom-built." The probe is about as tall as a basketball hoop and took almost three years to get this close.

**Why did NASA send a spacecraft to the sun?** Earth's star is unpredictable, and that can cause trouble. Explosions on the sun's surface sometimes send particles into space. These events can mess up the satellites that humans depend on for things like GPS mapping and weather tracking. Sometimes they even cause blackouts (big power and technology outages). "So we have to really understand how the solar corona works in order to prevent all the problems that can cause us," Raouafi says.

**What do scientists want to learn?** Using the pictures and data Parker collects, scientists are getting an amazingly up-close

view of the sun. The big goal is to figure out signs that a solar storm is about to happen, so we can protect electronics and make sure that astronauts take shelter until the storm passes. "If we want to send women and men to the moon and Mars and beyond, we have to protect them," Raouafi explains. Of course, the mission is also to learn more about our solar system's only star!

**How come the Parker Probe doesn't melt or burn up?** "Imagine the hottest summer day ever," Raouafi says. "Multiply that by 500." That's how hot it feels near the sun. To protect the probe's telescopes and sensors, engineers invented a heat shield

that can absorb heat and reflect sunlight. The shield is only 4.5 inches thick, but it does its job: When the probe is closest to the sun, it will be the equivalent of 2,500 degrees in front of the shield — but behind, where the "brain" of the spacecraft is, it will only feel like 89 degrees.

**What's the spacecraft going to do next?** Right now the craft is making a series of orbits that will bring it even closer to the sun with every trip around it. On Christmas Eve 2024, the probe will come within four million miles of its surface. That's a million miles nearer than it came in 2021, and the closest any spacecraft has ever gotten to any star. ♦