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The Great American Solar Eclipse — August 21 – Evergreen Audubon

5-7 minutes

Getting ready for the Eclipse

Bill Hackos

On August 21, most of North America will experience a solar eclipse. The moon will pass directly between the Earth and the Sun, blocking some of the light from the sun to the earth. In a narrow band stretching from the Oregon coast to South Carolina, the moon will block out all of the sun's light for about two minutes. Colorado is not in the path of totality but northeastern Colorado is very close. During the peak of the solar eclipse, Denver will lose 93% of its sunlight. Cities in the path of totality like Casper WY, and Lincoln and Omaha, NB will be in the path of totality, losing 100% of their sunlight for about 2 minutes.

A total solar eclipse is a rare event. The last time a total eclipse of the sun passed across the United States was in 1918. For the 2017 eclipse, it is estimated that 220 million people live within 500 miles of the path of Totality. People have been planning for this event for several years. Many cities in the path have planned for eclipse festivals. All hotels and campgrounds have been sold out for many months. Remaining rooms are selling out for more

than $1,000/night. JoAnn and I have booked a room in Sterling, CO and will make a 100-mile drive early in the morning to Alliance, NE to view the eclipse.

What is a solar eclipse?

When you observe a total solar eclipse, you are in the moon's shadow. The moon casts shadows on the earth as it is illuminated by the solar light. The moon's shadow normally does not fall on the earth because the orbits of the earth and moon are inclined to each other, causing the moon's shadow to miss the earth during the moon's monthly revolution around the earth. On the rare occasions that the moon's shadow reaches the earth, the area it hits on the earth is actually quite small. The August 21 solar eclipse path is only about 70 miles wide, hence the migration of observers to the path of totality.

You can see an excellent animation of the eclipse at www.timeanddate.com/eclipse/solar/2017-august-21

What is a lunar eclipse?

A lunar eclipse happens when the earth's shadow is cast on the moon. When you observe a lunar eclipse, you are looking at the earth's shadow on the surface of the moon.

What to look for in the August 21 total solar eclipse

Total Solar Eclipse (c) Luc Viatour / www.Lucnix.be

Get to your preferred site about two hours before the predicted totality. The edge of the moon's shadow will gradually cover the disk of the sun for about 80 minutes before totality. Use your pinhole camera or special eclipse glasses to watch the shadow progressing over the sun. Do not look at the sun!

Gradually the light around you will get darker. Mammals and birds will respond to the change in light. Look on the ground around you. Light filtered by tree leaves will act as pin hole cameras, creating thousands of crescent-shaped patterns on the ground.

As the shadow moves to your position, you will notice a darkening of the sky as if a storm is coming. When the entire disk of the sun is blocked at your site, that is totality. You can take off your dark glasses and enjoy the display of the upper atmosphere of the sun, the corona. Enjoy your two minutes. Soon the sun will start be visible. Again–do not look at the sun! In another 80 minutes, the spectacle will be over.

Safety

Even a short exposure to full sunlight can be damaging to the eye. Do not look at the sun. If you are with children, they should observe using a pinhole camera. Make sure that the kids use the pinhole camera except during totality when it is safe to look at the darkened sun. Make sure they look away and go back to the pinhole camera as soon as the smallest glimmer of sunlight is

visible.

Don't look through binoculars or a telescope directly at the sun. You can severely damage your eyes.

What if it's cloudy? Here in the High Plains, weather forecasters predict a 70% probability of clear sky for the eclipse. If you happen to be in the unfortunate 30%, you will at least have seen the sudden darkening and the beauty of the Great Plains.

Constructing a pinhole Camera

We purchased several pairs of dark eclipse glasses online. You can also find lots of instructions for making elaborate pinhole cameras online. But we stick to something really simple and cheap. Find a long box. A shoebox will do, but you'll see a larger image of the sun if your box is longer or if you have very big feet. Using a nail, puncture a hole in the center of the short end of the box. As the eclipse starts, hold your box with the hole pointed at the sun. Angle the lid over the box to darken the field of view. You'll see the image of the sun and the progressive shadow on the opposite side of the box.

Here are instructions and a drawing, although we don't recommend a hole for your head. www.timeanddate.com/eclipse/box-pinhole-projector.html

Another simple setup using 2 sheets of cardboard can be found at www.timeanddate.com/eclipse/make-pinhole-projector.html

Bill Hackos has a PhD in Astrophysics. He taught Astronomy and Physics at Central Michigan University and the University of Texas of the Permian Basin. He has observed the stars using major telescopes in the Davis Mountains of West Texas (McDonald Observatory) and in southern Arizona (Kitt Peak

National Observatory). He has not yet seen a total solar eclipse!