

The Great American Eclipse

On Aug. 21, 2017, a total solar eclipse will cut a swath across Missouri

on its path over 14 United States. For about two minutes, the sky within the path, about 70 miles wide, will go dark. This period of darkness is called **totality**.

The totality, or **umbra** of the eclipse, will take about 17 minutes to cross Missouri. It will enter the state in the far northwest corner at 1:04 p.m., and will exit southeast of Cape Girardeau at 1:21 p.m.

But the whole eclipse experience will start with **first contact**, which is when the moon first "touches" the edge of the sun — that's the start of what is called the **partial phase**. For viewers in the most northwestern corner of Missouri,

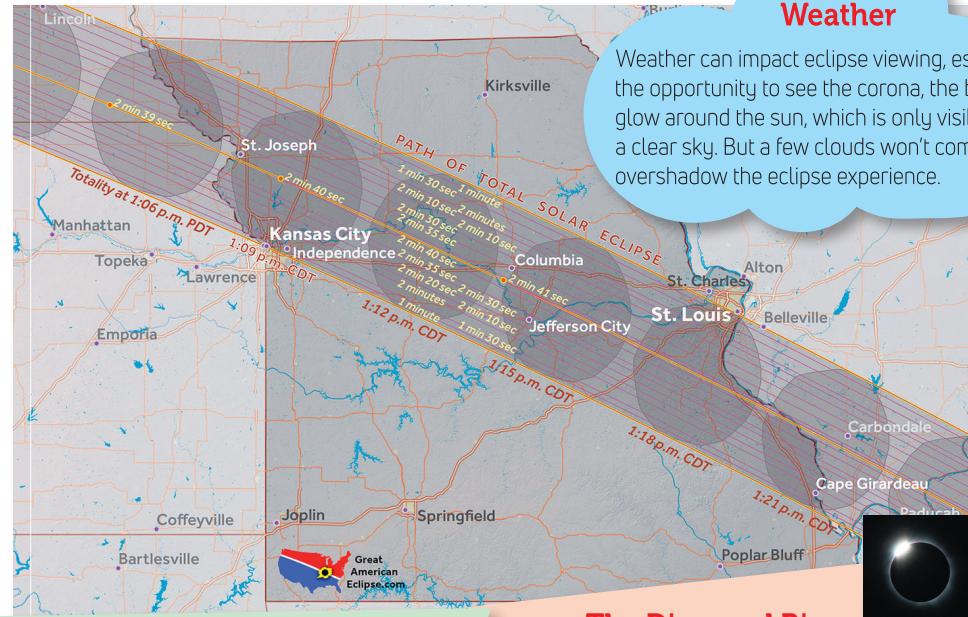
that will happen at 11:38 a.m.

The end — when the moon has moved all the way across the state, and following the partial phase after totality — will come for the last Missourians in the southeast at 2:48 p.m.

Nationwide, it will take the shadow of the total solar eclipse 94 minutes to travel the U.S. from central Oregon to South Carolina.

Viewers who aren't directly in the path will only see a partial eclipse. To see a list of Missouri communities in the path, visit www.eclipse2017.org/2017/states/mo.htm.

Another important aspect of eclipse viewing is safety. Eyes can be seriously damaged by looking at the sun, even in partial eclipse phases, without protection.



Weather

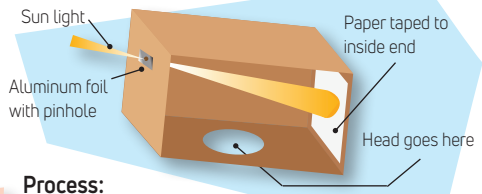
Weather can impact eclipse viewing, especially the opportunity to see the corona, the bright glow around the sun, which is only visible during a clear sky. But a few clouds won't completely overshadow the eclipse experience.

Make a Pinhole Projector to View the Eclipse

In this project, you will use common materials to create a device that allows you to safely view the solar eclipse.

Materials Needed:

Long Box (minimum 6-ft. long) The longer your box is, the bigger your image of the sun will be.
Aluminum Foil, Pin, Sheet of White Paper
Duct Tape, Small Cardboard Pieces



Process:

1. If you do not have a long box or tube, create one by taping two or more shorter tubes together. Remember to cut the ends of the tube and tape them together so light can travel the entire length of the tube.
2. Cover the end of the viewing tube with a piece of cardboard. Cut a 1-inch hole in the center of the cardboard. Tape a piece of foil over the hole, then poke a small hole in the foil with a pin.
3. At the other end of the tube, cut a good-sized viewing hole in the side of the box. Put a piece of white paper at the end of the box, right inside the viewing hole. This is the screen where your projected sun will appear.
4. When you use your viewer, you will point the pinhole end of the box right at the sun. To aim it, move it around until you see a round spot of light on the paper at the other end. That is your pinhole image of the sun.

Learning Standards: I can follow sequential directions to create a replica. I can make text-to-world connections.

Learn more: eclipse.aas.org

Read more: "When the Sun Goes Dark," by Fraknoi and Schatz

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Changeable U.S. Postage Stamp

The U.S. Postal service will release a first-of-its-kind stamp that changes when you touch it to commemorate the 2017 eclipse. The "Total Eclipse of the Sun" Forever stamp transforms into an image of the moon from the heat of a finger.



The Diamond Ring

One phenomenon associated with a total solar eclipse is the "diamond ring." It appears just before the beginning of totality, when a single bright point of sunlight — the diamond — shines through a deep valley on the moon's edge and the inner corona — the ring — becomes visible. A second diamond ring appears at the end of totality when a deep valley on the opposite side of the retreating moon exposes a single bead of bright sunlight that begins to wash out the corona.

Rick Fienberg/TravelQuest International/Wilderness Travel and eclipse.aas.org.

Be Safe When Viewing

These and other tips on how to view the 2017 Solar Eclipse Safely can be found at <https://eclipse.aas.org/eye-safety/safe-viewing>.

- It's never safe to look at the sun without protection, and the view leading up to the total solar eclipse is no different. Wearing safe eyewear is essential. Even cameras and cell phones can be damaged by their view of the sun.
- No sunglasses, X-rays, undeveloped film or other homemade filters are safe for looking at the sun.
- Be sure eclipse glasses and hand-held solar viewers are certified (ISO 12312-2) to meet international safety standards. Certification should be printed inside.
- Do not cover or remove your eclipse glasses or filter while looking at the sun. Always turn away for both steps.
- Don't look at the uneclipsed or partially eclipsed sun through an unfiltered camera, telescope, binoculars, or any other optical device while using your eclipse glasses or hand-held solar viewer — the concentrated solar rays will damage the filter and enter your eye(s), causing serious injury.
- A total solar eclipse is about as bright as a full moon, and just as safe to look at, but totality passes quickly, and then filters are essential.

Eclipse watcher: I heard it was never safe to look directly at the sun without protective eyewear — is that true?

Doctor Speck: It's certainly true that you should never look at the bright disc of the sun without protection, but during totality — when the moon totally covers the main disc of the sun, the moon provides protection, the sun's atmosphere is still visible, but only as bright as a full moon and so safe to look at with the naked eye.

Eclipse watcher: I heard it's okay to look at the partial eclipse through undeveloped film, or X-ray film, or smoked glass.

Doctor Speck: None of those techniques is safe. While it helps with the comfort level (it doesn't hurt so much to look at the sun because it is darkened), it doesn't cut out all the harmful light rays, especially in the infrared. The retina does not have nerves, so we don't feel any pain even when damage is happening.

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