The Big Eclipse

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The Big Eclipse
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The illustrations in this book were done in Caran d'Ache Neopastels on black Canson paper.

It's a sunny morning at the beach in Oregon, but it's about to get dark! The Moon is starting to block the Sun—here comes the shadow of a solar eclipse! For more, let's go to our Eye-in-the-Sky!

A total solar eclipse is racing over the Pacific, at more than three times the speed of sound. Prepare for totality of 1 minute 58 seconds, beginning at 10:15:50 a.m. Pacific Daylight Time—sharp!

Ready for totality?

Totally!

A total solar eclipse begins with **first contact**, when the Moon looks like it's touching the Sun. Next is the **partial eclipse** phase. The Moon begins covering the Sun, and it looks like it's taking a bite out of it.

Soon, the Moon completely blocks the Sun from view and casts a shadow on the Earth—a phase called **totality**. After totality comes a partial eclipse phase once again.

I'm confused. The Moon is much smaller than the Sun. How can the Moon's shadow block the Sun completely?

Imagine someone is ready to take your photo. Then imagine that I fly in between you and the camera! Because I would be closer, I'd appear larger—and the photo would be of me, not a big hippo!

Be wise, protect your eyes!

We're following the total eclipse, heading east across the United States. Even though the path of totality won't cross every state, many of you will experience a partial eclipse where you live. That means wearing protective eyewear if you want to look at the Sun!

WEAR YOUR SPECS!

Protect Your Eyes!

When looking directly at the Sun, even during an eclipse, you'll need to protect your eyes. Sunglasses will NOT do the job!

Totality and protective eyewear

The only time protective eyewear may be removed is during totality. You'll need to learn the exact time totality starts and ends in your area.

On eclipse day, pick a timekeeper to shout out the exact time totality begins. Only then can you safely remove your eclipse glasses. Put your glasses back on when totality ends.

How to stay safe:

- Wear your **special eclipse glasses** (find online or in gift shops).
- Wear **welder's goggles** with lens glass rated 14 or higher.
- Make a **pinhole projector**—an easy and fun project!
- **Cover** the lenses of binoculars, telescopes or cameras with solar filters—place the filter on the front, not on the back where you place your eye.

Eclipse Myths

In early times, people were often frightened by eclipses because they didn't understand how they worked. They invented fantastical tales to explain them.

In Vietnam, a legend told of a frog devouring the sun. In Korea, it was thought that fire dogs chased the sun until it was captured and eaten. In one Viking fable, a wolf named Skoll hunted down the sun god, Sol. The Chinese made loud noises—to scare away the dragon they thought had swallowed the sun.

In the Far North, eclipses aren't frightening. The Inuit tell a legend about Anningan, the moon god and his sister, the sun goddess, Malina. After a quarrel, Malina ran away. Her brother followed, finally catching up and causing an eclipse. The Eskimos, Aleuts and Tlingit believe that an eclipse allows the Sun to leave the sky and make sure things are all right on Earth.

This is the first solar eclipse to cross the United States from coast to coast since 1918, and about 12 million people live right in the path of totality. Around 500 million people in North America will see a partial eclipse, unless they take a short trip to see totality!

Look at all the visitors from around the world, here to view "The Big Eclipse" too!

Hurray, we're in totality—the only safe time to remove our eclipse glasses! The Moon now completely covers the Sun. The sky is a deep, dark blue—it almost feels like nighttime.

Strange eclipse effects

In the moments before totality, the sky darkens and the temperature may drop several degrees. Shadows sharpen and faint shadows called shadow bands ripple across the ground.

Right before totality, you may see Baily's Beads appear—bright dots of light that are the Sun's rays shining between the Moon's mountains, followed by a huge flash of light—the Diamond Ring effect!

Careful! Keep your eclipse glasses on until the Diamond Ring disappears and totality begins. The only safe time to view a total solar eclipse without eye protection is during totality. Once the sky is dark you can remove your glasses, but put them back on when it starts to get bright.

Eclipses and animals

As the sky darkens before an eclipse, birds become quieter and quieter. Crickets will begin chirping, thinking it's nighttime.

During a solar eclipse in June, 2001, researchers in Zimbabwe observed a herd of hippos resting on a sandbar on the Zambezi River. As the sky darkened, the spooked hippos got up and made for the river, where they usually looked for food at dinnertime. But when the light returned, the hippos stopped abruptly and appeared confused, a state they were in for the rest of the day.

Eye-in-the-Sky reporting from McClellanville, South Carolina, the last point on land in the United States to experience totality. And now the shadow is racing off to sea again—this time over the Atlantic. It will continue its journey for another hour and 15 minutes before leaving Earth. It's been 1 hour and 33 minutes, 3.6 seconds and we've crossed the whole country!

How old will you be when the next big eclipse happens?

See you on April 8, 2024 at the next North American solar eclipse!

Totally old! How old will YOU be?

Awesome!

Plan ahead! Here's a list of dates for total solar eclipses for the rest of the century that will cross at least part of North America:

April 8, 2024	May 11, 2078
March 30, 2033	May 1, 2079
August 23, 2044	September 23, 2090
August 12, 2045	May 11, 2097
September 23, 2071	September 14, 2099

How to Make a Pinhole Projector

To make a pinhole projector, you will need two sheets of stiff white paper or two white paper plates, and a pin (a safety pin or pushpin will work, too).

Create a small hole in the center of the first piece of paper or paper plate. Do not look at the sun through the hole!

Instead, stand with the sun behind you and use the paper with the hole in it to shade the second piece of paper. You will see an image of the sun and the phases of the eclipse as the sun's light shines through the hole.

This is a good way for several people to view the eclipse at once!

Solar Eclipse Glossary

Baily's Beads: The effect of sunlight shining across the Moon's terrain just before and after totality in a total solar eclipse, creating bright points of light at the edge of the Moon's disk.

Corona: The ghostly outer atmosphere of the Sun measuring a few million degrees in temperature—and the most beautiful sight of the eclipse.

Diamond Ring: A burst of sunlight that shines like a brilliant diamond on a ring, seen right before totality begins and as it ends.

First contact: When the partial phase of the eclipse begins.

Partial eclipse: When the Moon partially covers the Sun's disk and casts a light shadow—the penumbra—on Earth. All total eclipses begin and end with a partial eclipse.

Penumbra: The lighter part of the Moon's shadow. We stand in the Moon's penumbral shadow during the partial phases of a solar eclipse.

Prominences: Bright features of incandescent plasma seen on the Sun's edge or limb. These hot, glowing structures emanate from the photosphere.

Shadow bands: Faint wavy bands caused by the bending of light in Earth's atmosphere that move across the ground right before and after totality.

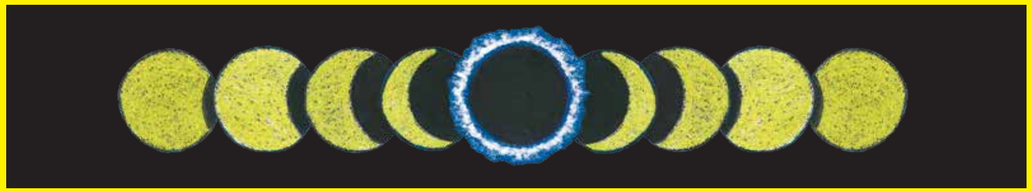
Syzygy: When three celestial bodies line up in space as in a transit or eclipse.

Total solar eclipse: When the disk of the Moon completely covers the Sun's surface, revealing the solar corona and casting a deep shadow on the Earth—the umbra.

Totality: When the Moon completely blocks the Sun from view and casts a shadow on the Earth. The maximum width of the path of totality is 167 miles.

Umbra: The darkest part of the Moon's shadow, seen when the Moon completely obscures the Sun during a total solar eclipse. Observers of total eclipses stand in the umbra.

Umbraphile: A person who loves eclipses and will travel anywhere to see them. Are you an umbraphile?



Totally Fun Facts from States in the Path of Totality

Oregon: This state has more ghost towns than any other state in the country.

Idaho: In this state, it is illegal to give someone a box of candy weighing more than 50 pounds.

Wyoming: Of all the 50 states, Wyoming has the smallest population.

Nebraska: Home of the strobe light invented by Dr. Harold Edgerton in 1931.

Kansas: Home to the world's largest ball of twine—weighing 20,134 pounds, and growing!

Missouri: State instrument? The fiddle. State animal? The mule.

Illinois: It is against the law to eat in any restaurant that is on fire.

Kentucky: In this state in 1893 the song "Happy Birthday to You" was created and sung for the very first time.

Tennessee: This state boasts more caves than any other state—more than 3800 caves documented, so far. That's a lot of bats, too!

North Carolina: Don't even think about using an elephant to plow a cotton field. It's not allowed.

Georgia: Leave your pet at home. It's illegal to tie a giraffe to a light pole in parts of this state.

South Carolina: You can tie a giraffe to a pole but don't try buying or selling an electric eel—that's against the law.