



THE DISAPPEARING SUN

— TOTAL SOLAR ECLIPSE TO OCCUR IN PARTS OF CANADA ON APRIL 8



If April 8 is a clear day, many Canadians will watch the Sun vanish. The reason? The Moon will line up perfectly between the Earth and the Sun. This will block the Sun and cast a shadow on parts of Earth. Such an event is called a total solar eclipse.

A PLACE-SPECIFIC EVENT

An eclipse is place-specific. It is only visible along the path where the Moon blocks the Sun. The path where a solar eclipse is complete is called the “path of totality.”

Imagine holding a dinner plate between you and a lamp. Line things up so that it looks like the lamp and plate are about the same size. If you're directly behind the plate, the lamp will not be visible. Your friend standing beside you may see part of the lamp past the edge of the plate. Someone a few steps away will see the lamp normally. The plate will not affect their view.

For places far from the path of totality, there will be no sign of the eclipse. Places outside the path but near it will see a partial eclipse that dims the sky like twilight. A total eclipse brings near-complete darkness along the path.

Imagine how scary a total solar eclipse seemed to people long ago. To the ancient Greeks, who believed the gods were angry, it **heralded** disaster. The word eclipse comes from the Greek word “ekleipsis.” That translates to “being abandoned.”

A RARE TOTAL ECLIPSE

The diameter of the Sun is about 400 times that of the Moon. How can something so much smaller block the Sun? Because the Sun is about 400 times farther away from the Earth than the Moon is.

If the Moon was only 273 kilometres smaller in diameter, a total eclipse would not be

possible. The same is true if it were any farther from Earth. As it is, the Moon's orbit around Earth is **elliptical**. When an eclipse happens with the Moon at the far point of its orbit, it can't block the Sun completely. Instead, a halo of light appears around the Moon. This is called an annular eclipse.

In the far future, total eclipses may no longer occur because the Moon is slipping away from the Earth by a tiny amount (about 3.8 centimetres) each year.

A solar eclipse can happen only during a new moon phase when the Moon is between Earth and the Sun. At such times the Moon appears dark to us.

Why don't we get an eclipse with every new moon? If the orbit of the Moon around Earth were on exactly the same plane as the orbit of Earth around the Sun, we would. But the orbit of the Moon tilts about five degrees

DEFINITIONS

ELLIPTICAL: shaped like an oval

HERALD: to be a sign that (something) is about to happen



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relative to Earth's orbit around the Sun. Usually, when the Moon passes in front of the Sun, the Moon's shadow reaches into space and doesn't fall on Earth.

A PATH OF DARKNESS

The April 8 solar eclipse will create a line of darkness through parts of Mexico, the United States, and Canada. There won't be another total solar eclipse in North America until 2044.

In Canada, the path of totality will travel through the eastern provinces. Some Ontario cities to be plunged into shadow include Port Dover, Niagara Falls, Hamilton, Belleville, Kingston, and Cornwall. In Québec, Sherbrooke, Saint-Georges, and parts of southern Montréal will experience the full eclipse. So will residents of Fredericton, Miramichi, and the northern tip of Cape Breton Island.

Cities closest to the centre of the path of totality will have the longest eclipses. The total eclipse may last just a few seconds or as long as three and a half minutes.

NASA calculates that the eclipse will peak in Canada along the north shore of Lake Erie just before 3:15 pm. Minutes later, it will darken cities along Lake Ontario. It will reach residents of central New Brunswick and

STAYING SAFE

As amazing as the eclipse will be, it's not safe to look at it without protection. The infrared radiation can cause permanent eye damage. Sunglasses aren't enough. Looking through dark material such as a garbage bag won't cut it, either. The same goes for using binoculars or a telescope that don't have a solar filter. You need to wear special eclipse glasses to view an eclipse.

If you don't have eclipse glasses, you can build a pinhole camera to observe the shadow cast by the Moon in miniature.

You can also experience the eclipse with your ears! One free app, Soundscapes, includes an interactive "Rumble Map." It transforms the eclipse into a touch- and sound-based experience. Another option is to build a LightSound Device, developed at Harvard University. It outputs sound based on detected brightness. As the Moon blocks the Sun, the sound levels decrease.

The tools were developed for the Blind and Low Vision community, but anyone can use them to safely enhance the eclipse experience.

western Prince Edward Island after 4:30 their time. Canada's final glimpse of it will be at 5:10 local time in Newfoundland,

A BIG OPPORTUNITY

Total solar eclipses occur about every 400 years or so. The last time Kingston, Ontario, was in the path of totality was nearly 700 years ago, in 1349. The next time will be 375 years from now, in 2399. So cities in the path of totality can expect many visitors on April 8. As the eclipse approaches, they'll see the sky darken. Temperatures may drop by more than five degrees.

Meanwhile, scientists will use this chance to study the Sun's

corona, or outer atmosphere. It's usually impossible to see because the Sun is so bright. They want to better understand why the corona can reach temperatures of millions of degrees. Yet the Sun's surface hovers at around 5500 degrees Celsius. They are also planning experiments involving animal noises. What do they expect to hear? More cricket sounds because many cricket species search for mates in twilight.

They aren't sure exactly what else the eclipse will bring. But unlike the ancient Greeks, they see it as a learning experience – not something to fear. ★

DEFINITIONS

NASA: National Aeronautics and Space Administration – an independent agency of the U.S. federal government responsible for the civil space program, aeronautics research, and space research