August 21 Solar Eclipse Guide

ECLIPSE 2017

The RASC is proud to sponsor these special eclipse observing events. We hope everyone has clear skies and enjoys the eclipse. Be sure to be safe and use the supplied solar viewers! It has been several years since a partial solar eclipse was visible across the entire country. Canada has had total solar eclipses in 1963, 1972, 1979 and 2008. The next opportunity to see a total solar eclipse from Canadian soil is April 8, 2024, visible in Ontario, Quebec, New Brunswick, P.E.I. and Newfoundland and Labrador. For more information on becoming a member of the RASC, go to http://rasc.ca/join-us.

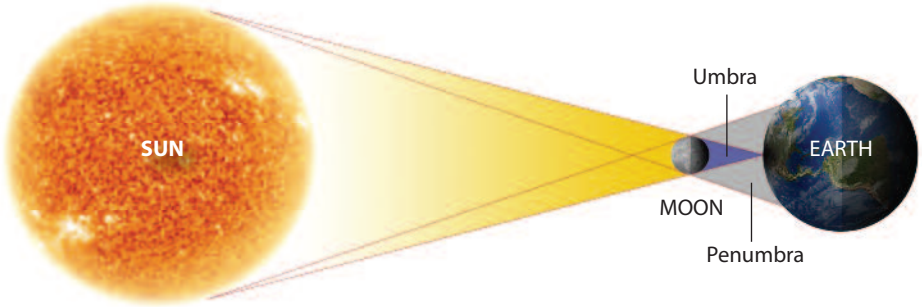
Celestial Shadow Show

by DAVID A. RODGER

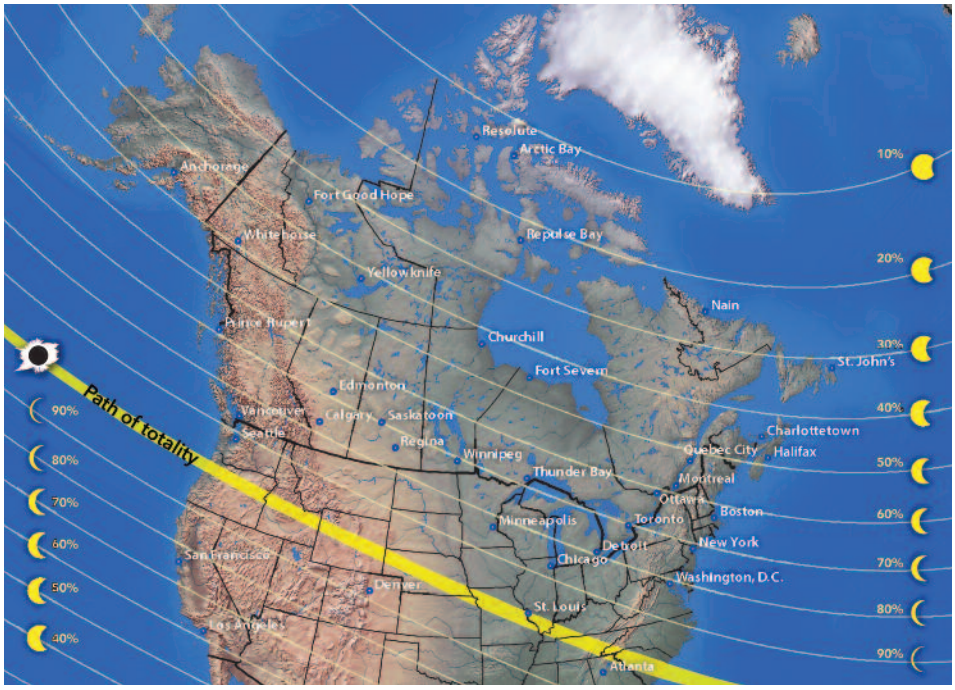
A TOTAL solar eclipse occurs when the Moon passes directly in front of the Sun. For a few precious moments, the Sun's pearl-white corona and red prominences encircle the blackened solar disc. This magnificent spectacle is possible only because the Sun and Moon appear almost the same size. In other words, their angular diameters are nearly identical thanks to an amazing coincidence: The Moon is roughly 400 times smaller than the Sun, but it's approximately 400 times closer to us. If the numbers for size and distance weren't in balance, the Moon wouldn't precisely cover the Sun to create a total eclipse.

The highly anticipated total eclipse of August 21, 2017, will begin when the tip of the Moon's conical shadow (the umbra) touches the Pacific Ocean, north of Hawaii. At that point, the oval umbra will be five dozen kilometres wide. Racing essentially southeastward at more than 3,000 kilometres per hour, the umbra will make landfall at Oregon, then traverse the contiguous United States, exiting at South Carolina. The dusky oval will almost double in size during this time, then slowly shrink before lifting away from Earth in the eastern part of the Atlantic Ocean, off the coast of Africa.

Anyone located within that long, narrow path of totality will experience the rare sensation of a complete solar blackout. It will last mere seconds along either edge of that corridor but will persist for many dozens of seconds near its centre. The maximum possible length of totality—2 minutes 40.3 seconds—will unfold right on the centre line at the path's halfway point, in southern Illinois. There, the crucial strip of darkness will be 115 kilometres wide. ✦



MOON SHADOW For a solar eclipse to happen, the Moon's long conical shadow must reach Earth. The lunar umbra, which produces the brief period of totality, covers only a small patch of the Earth's surface at any given moment. The lunar penumbra, where a partial eclipse is visible, spreads over a much wider area. *SKYNEWS* ILLUSTRATION



WHAT'S THE PERCENTAGE? Weather permitting, all of Canada will get to see a partial eclipse on August 21, but how much of the Sun you'll see covered by the Moon depends on where you are. As this map illustrates, the closer to the path of totality you're situated, the greater the percentage of the solar disc eclipsed by the Moon. MAP COURTESY MICHAEL ZEILER/GREATAMERICANECLIPSE.COM

Astronomy organizations will team up with various partners to provide safe views of the Sun as the Moon passes in front of it. For a list of sites go to: **http://rasc.ca/solar-eclipse-2017**. Solar viewers are for sale at the RASC estore—go to the **rasc.ca** site and look under observational aids.

Enjoying the Partial Eclipse

by ALAN DYER

ECLIPSE 2017

CANADA hasn't witnessed a solar eclipse since October 23, 2014 (excluding eastern Newfoundland,which saw the tiniest nip out of the solar disc at sunrise on March 20, 2015). On August 21, that changes. All of Canada and the United States will enjoy a partial eclipse. Sure, a partial eclipse is much less spectacular than totality, but not everyone can get to the centre line.

Southern Canada and much of the United States will see a substantial portion of the Sun covered. Will the day look darker? That depends on where you're situated. When roughly 80 percent of the solar disc is covered, daylight is sufficiently dimmed to be noticeable. Alert observers can even see a difference with less than 60 percent of the Sun eclipsed. At 90 percent, just a thin slit of sunlight remains visible and the lighting not only is greatly diminished but also begins to take on a silvery or steely appearance and shadows appear unnaturally sharp. Any small opening, such as the spaces between leaves, will project a tiny "pinhole" image of the crescent Sun onto the ground. These effects are visible to some extent from locations farther north, but in areas where only 50 to 75 percent of the Sun is covered, you might not notice much going on. ✦

AUGUST 21 ECLIPSE TIMES FOR CANADA

Location	Eclipse Begins	Mideclipse	Eclipse Ends	Maximum Coverage
Victoria (PDT)	9:09 a.m.	10:20 a.m.	11:37 a.m.	91%
Vancouver (PDT)	9:10 a.m.	10:21 a.m.	11:37 a.m.	88%
Whitehorse (PDT)	9:23 a.m.	10:22 a.m.	11:24 a.m.	58%
Calgary (MDT)	10:20 a.m.	11:33 a.m.	12:50 p.m.	81%
Edmonton (MDT)	10:24 a.m.	11:35 a.m.	12:49 p.m.	74%
Saskatoon (CST)	10:29 a.m.	11:43 a.m.	1:00 p.m.	76%
Regina (CST)	10:30 a.m.	11:46 a.m.	1:04 p.m.	79%
Winnipeg (CDT)	11:40 a.m.	12:57 p.m.	2:15 p.m.	76%
Thunder Bay (EDT)	12:52 p.m.	2:11 p.m.	3:28 p.m.	74%
Windsor (EDT)	1:03 p.m.	2:27 p.m.	3:47 p.m.	77%
London (EDT)	1:07 p.m.	2:30 p.m.	3:48 p.m.	79%
Kitchener-Waterloo (EDT)	1:08 p.m.	2:31 p.m.	3:49 p.m.	77%
Mississauga (EDT)	1:10 p.m.	2:31 p.m.	3:49 p.m.	77%
Toronto (EDT)	1:10 p.m.	2:32 p.m.	3:49 p.m.	76%
Kingston (EDT)	1:16 p.m.	2:35 p.m.	3:50 p.m.	72%
Ottawa (EDT)	1:17 p.m.	2:35 p.m.	3:48 p.m.	68%
Montreal (EDT)	1:21 p.m.	2:38 p.m.	3:50 p.m.	66%
Quebec City (EDT)	1:26 p.m.	2:39 p.m.	3:49 p.m.	61%
Saint John (ADT)	2:37 p.m.	3:49 p.m.	4:56 p.m.	59%
Halifax (ADT)	2:42 p.m.	3:53 p.m.	4:58 p.m.	58%
St. John's (NDT)	3:29 p.m.	4:29 p.m.	5:24 p.m.	43%

A Word About Safety

You must use a solar filter made specifically for the purpose of viewing a partial solar eclipse. *Never* use photographic filters, sunglasses, exposed film, X-ray film, household Mylar, CDs, etc. The smoked glass your dad made for the eclipse you remember seeing as a child? Unsafe. While all these make the Sun appear somewhat dimmer, they may pass ultraviolet and infrared light, which could permanently damage your eyes. Play it safe: Use our *SkyNews* eclipse viewer, or one provided by the RASC.

If you plan to use a telescope or binoculars to view the event, you'll need a specialized filter designed to fit over the front aperture of the instrument. Never use eclipse glasses intended for naked-eye viewing in conjunction with any optical device!

PARTIAL SOLAR ECLIPSE PHOTO BY ALAN DYER

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