

STAR_Net Webinar Series

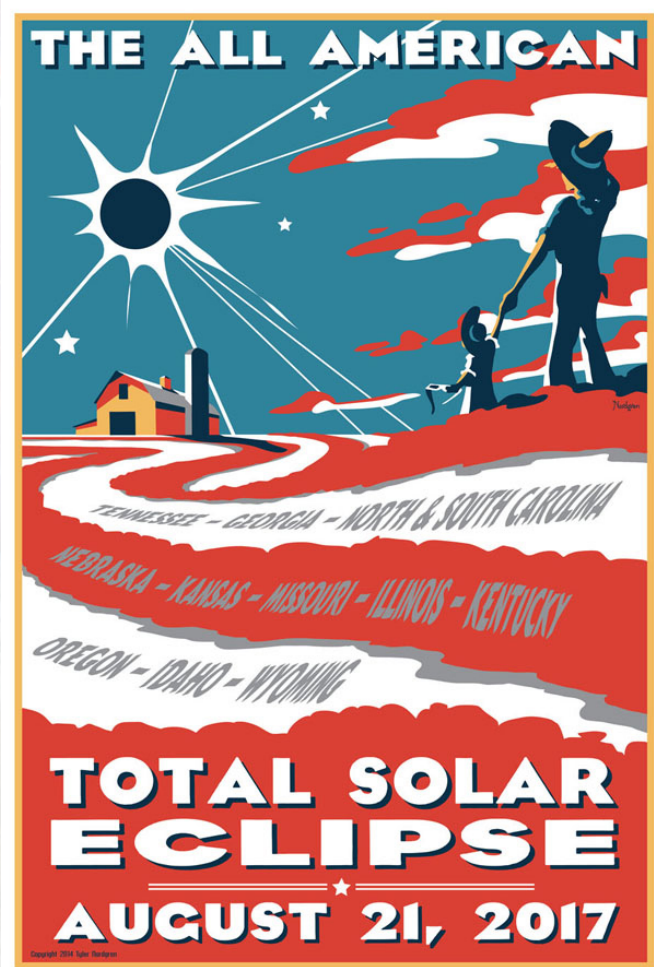
January 25th 2017

Total Eclipse 2017: The Outreach Event of the Decade

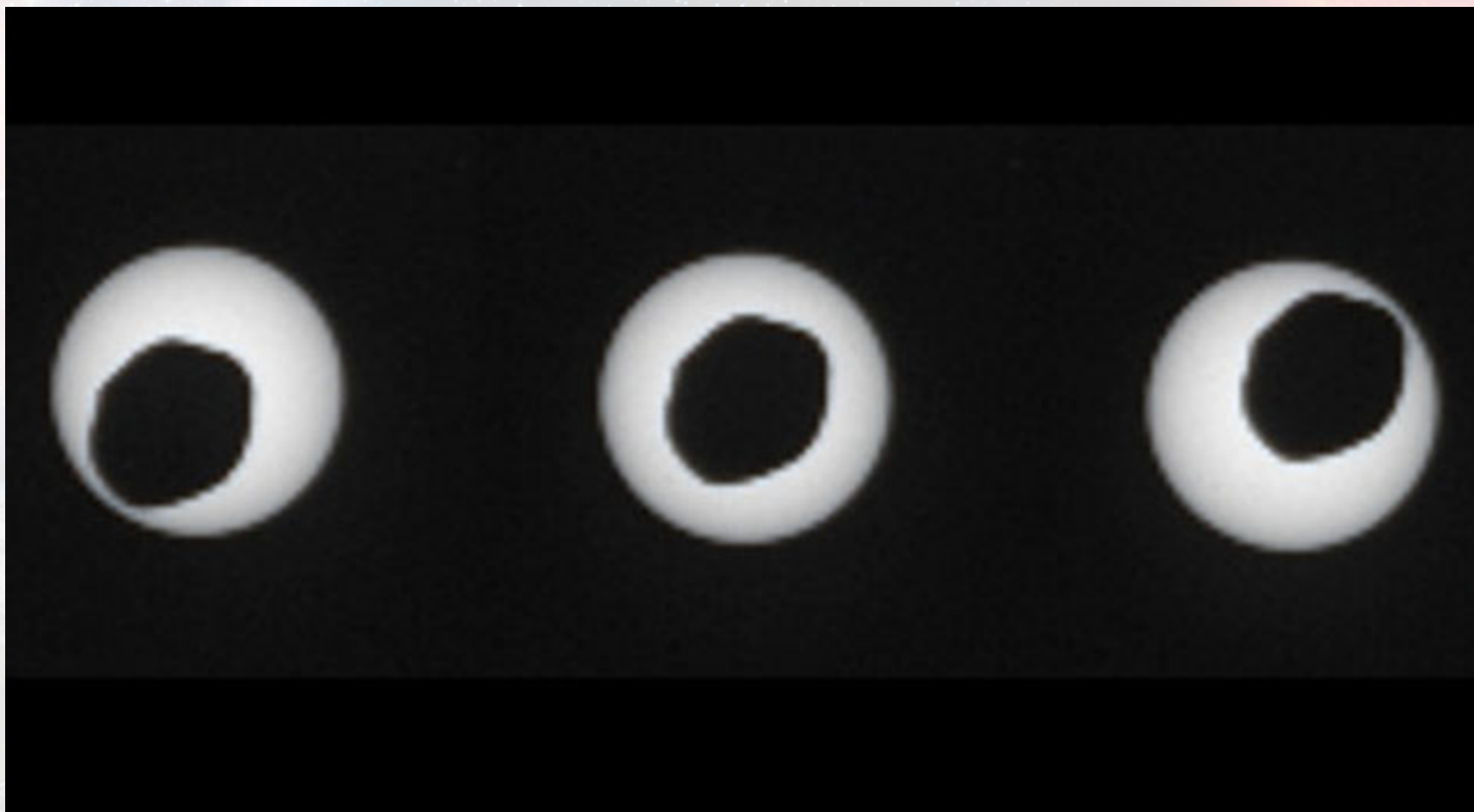
Hosts: Andrew Fraknoi and Dennis Schatz

If you are having audio problems, please
click the “communicate” button at the top
of your screen and then click “test audio”





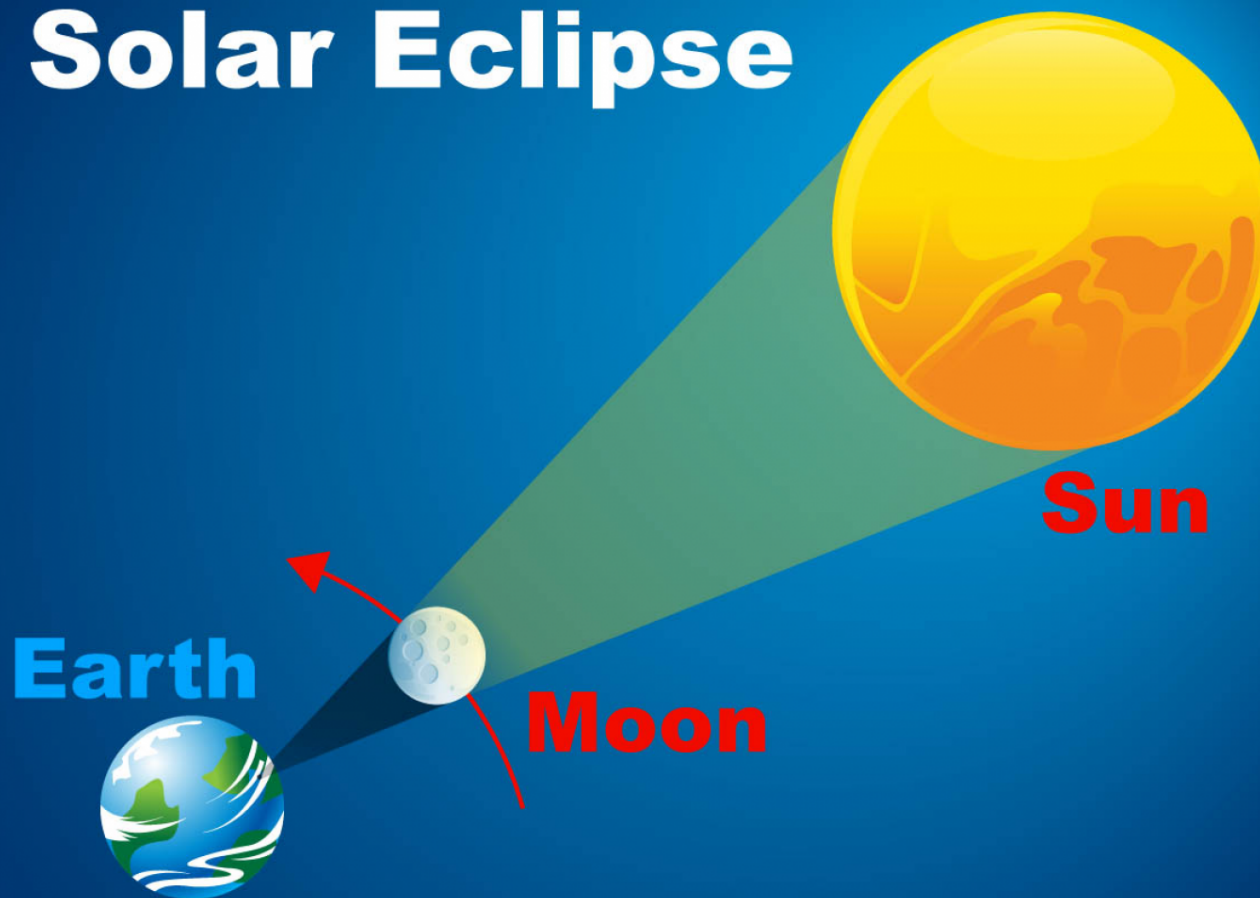
The All American Eclipse

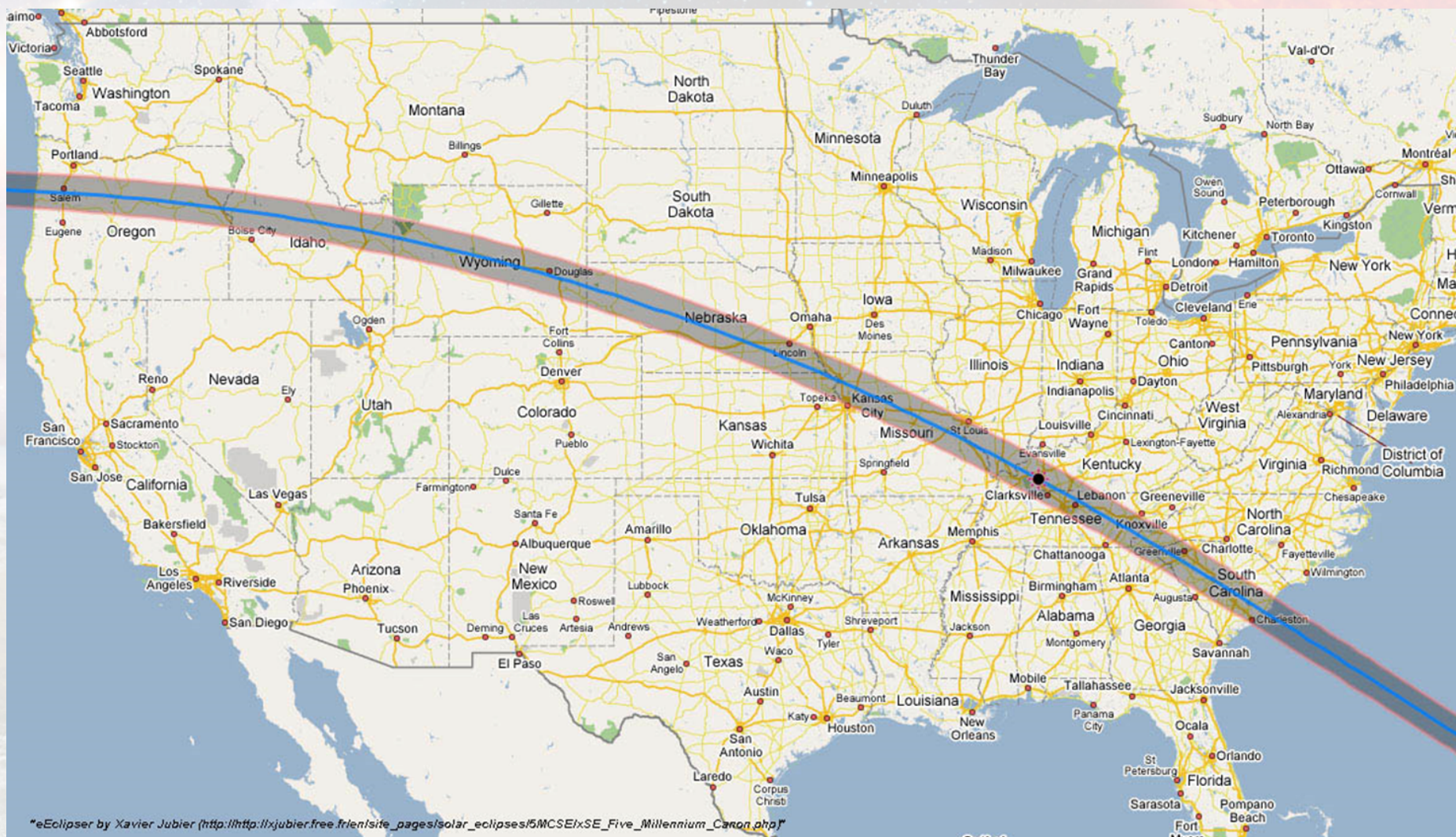


Mars' Moon Phobos Trying to Eclipse the Sun



Solar Eclipse



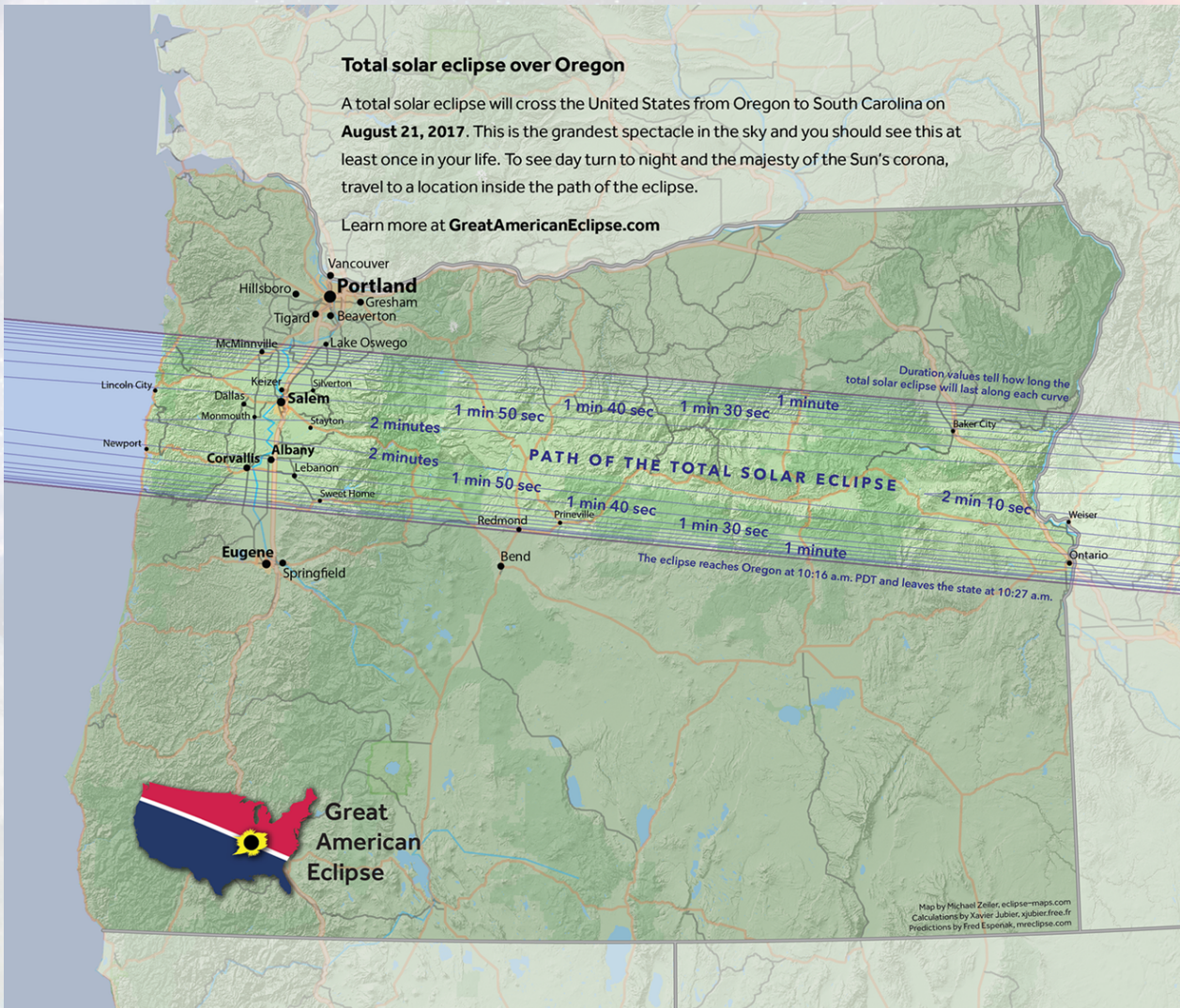


*eEclipsr by Xavier Jubier (http://http://xjubier.free.fr/en/site_pages/solar_eclipses/5MCSE/xe_Five_Millennium_Canon.php)

States Where the 2017 Eclipse is Total:



Oregon	Illinois
Idaho	Kentucky
Wyoming	Tennessee
Nebraska	Georgia
Kansas	North Carolina
Missouri	South Carolina





Population Statistics



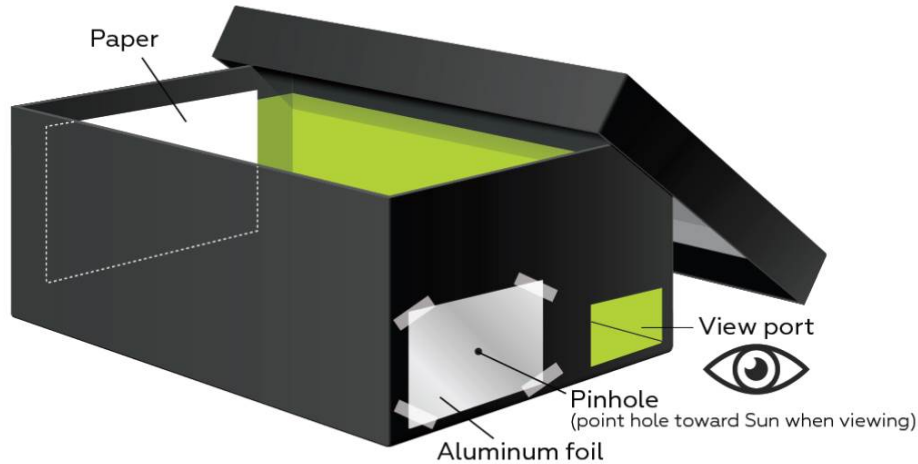
U.S. = 319 million
Canada = 35 million
Mexico = 119 million
TOTAL = 473 million





Mark Margolis / Rainbow Symphony

We'll need lots of eclipse glasses...



**Or other observing
strategies**

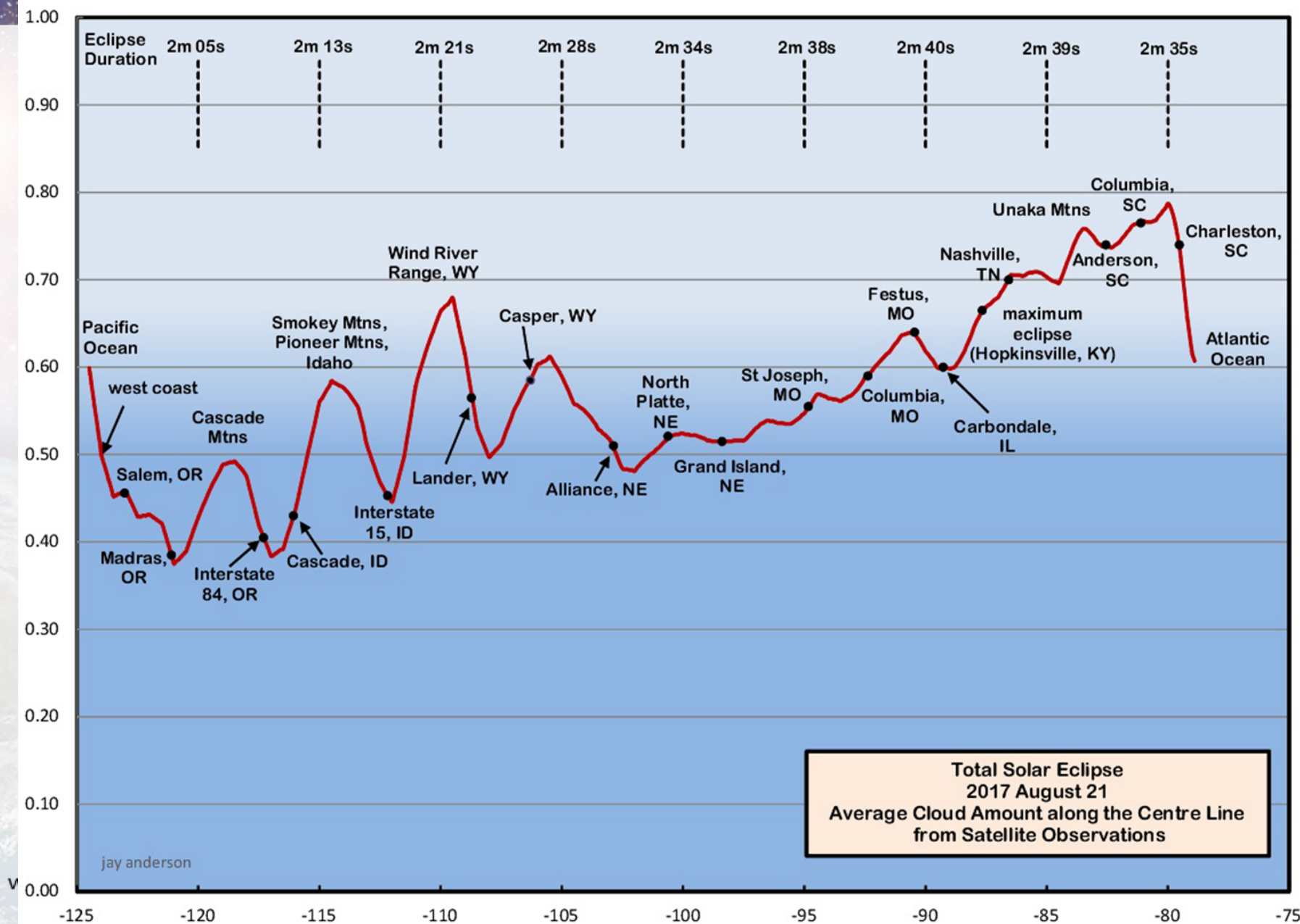


Timing for the Aug. 21, 2017 Partial Eclipse for the Largest Cities in the U.S.

City	Eclipse Starts	Max Eclipse	Eclipse Ends	Fraction of Sun's Diameter Covered	Percent of Sun's Area Covered
New York City	1:23 pm	2:45 pm	4:01 pm	0.77	71%
Los Angeles	9:06 am	10:21 am	11:45 am	0.69	62%
Chicago	11:54 am	1:20 pm	2:43 pm	0.89	87%
Houston	11:47 am	1:17 pm	2:46 pm	0.73	67%
Philadelphia	1:21 pm	2:44 pm	4:01 pm	0.8	75%
Phoenix	9:14 am	10:34 am	12:00 n	0.7	63%
San Antonio	11:41 am	1:09 pm	2:38 pm	0.69	61%
San Diego	9:07 am	10:23 am	11:47 am	0.66	58%
Dallas/Ft Worth	11:40 am	1:10 pm	2:39 pm	0.8	75%
San Francisco	9:01 am	10:15 am	11:37 am	0.8	76%
Indianapolis	12:58 pm	2:25 pm	3:49 pm	0.93	91%
Washington DC	1:18 pm	2:43 pm	4:02 pm	0.84	81%
Miami	1:27 pm	2:59 pm	4:21 pm	0.82	78%

Timing for Selected Cities Where the Eclipse Will be Total

City	Partial Eclipse Starts	Total Eclipse Starts	Total Eclipse Ends	Partial Eclipse Ends	Sun's Altitude At Totality
Salem, OR	9:05 am	10:17 am	10:19 am	11:38 am	40 degrees
Casper, WY	10:22 am	11:43 am	11:45 am	1:09 pm	54 degrees
St. Joseph, MO	11:41 am	1:06 pm	1:09 pm	2:34 pm	62 degrees
Carbondale, IL	11:52 am	1:20 pm	1:23 pm	2:48 pm	64 degrees
Nashville, TN	11:58 am	1:27 pm	1:29 pm	2:54 pm	64 degrees
Columbia, SC	1:13 pm	2:42 pm	2:44 pm	4:06 pm	62 degrees







AN OBSERVER'S GUIDE TO VIEWING THE ECLIPSE

SOLAR SCIENCE

ALL-AMERICAN TOTAL SOLAR ECLIPSE

AUGUST 21, 2017

By Andrew Fraknoi and Dennis Schatz

On Monday, August 21, 2017, a total eclipse of the Sun will be visible in the continental United States for the first time in almost 40 years. A total eclipse is when the Sun is completely hidden by the Moon, the sky becomes dark, and the Sun's faint atmosphere (*corona*) becomes visible—looking like a beautiful halo (Figure 1). This total eclipse will *only* be visible on a narrow track stretching across the United States from Oregon to South Carolina. No other country will get to see the total eclipse this time.

The rest of the United States and other parts of North and Central America will see a *partial* eclipse, in which the Moon covers only a portion of the Sun. A partial eclipse is interesting, but nowhere near as awe-inspiring and memorable as a total eclipse. A partial eclipse is also dangerous to look at without something to protect your eyes from the Sun's damaging rays.

What Exactly Is a Total Eclipse of the Sun?

A total eclipse of the Sun occurs when the Moon gets between the Sun and the Earth and covers up the Sun. It just so happens that the Moon, as seen from Earth, and the Sun, as seen from Earth, are the same size in the sky. So if the two are exactly lined up, the Moon can hide the Sun from our sight. This allows us to see the Sun's corona,

FIGURE 1

During a total eclipse, the Sun is covered by the Moon, and the faint light of its corona becomes visible.



Source: Luc Viatour, Wikimedia Commons, CC BY-SA 3.0. https://en.wikipedia.org/wiki/File:Solar_eclipse_1999_4_NR.jpg

For
free
distribution
by NSTA

An 8-page
summary of the
booklet in *Solar
Science*:

<http://bit.ly/2bkGSvA>

Or

www.nsta.org/solarscience

Eclipse Programming Events In the Months Leading up to the Eclipse



**Programming in the weeks and
months leading up to the eclipse is
JUST AS IMPORTANT
as what you do on the day of the
eclipse.**

Eclipse Display Area or Bulletin Board in the Library

Solar Eclipse August 21, 2017

Solar Tempest

Under the surface of the Sun lies a restless world of unbelievable energy. Deep within the Sun, powerful streams of plasma are released that bubble and boil to the surface. This energy frequently causes the surface of our star to violently erupt.

A Giant Prominence
Prominences are enormous hot tubes of plasma that arc far above the Sun's surface. Sometimes they can erupt. See how this one compares to Earth in size. Lucky for us that Earth is 93 million miles away.

Sunspots: Cool, Dark, and Magnetic
Sunspots are relatively dark patches on the Sun's bright surface. They are regions of concentrated magnetic fields that can last from several hours to several months. Sunspots appear dark because they're cooler (5000°C) than the plasma surrounding them (5500°C). They tend to develop in groups, with some groups covering areas 20 times the diameter of Earth.

Magnetic Loops
Two active regions with their intense magnetic fields produced towering arches and spiraling coils of solar loops above them as they rotated into view (June 10, 2014). When viewed in extreme ultraviolet light, magnetic field lines are revealed by charged particles that travel along them. These active regions appear as dark sunspots when viewed in visible light.

A CME explodes from the Sun's surface
The Sun's corona can rip open and spew as much as 20 billion tons of material into space. These explosions are known as Coronal Mass Ejections, or CMEs. Often loop-like or bubble-like in appearance, they are the hurricanes of space weather.

STARnet
Science-Technology Activities &
Resources For Libraries
NCIL
National Center for
Interactive Learning

Rocks and Minerals

Rocks are Made of Minerals
Metamorphic
Igneous
Sedimentary
Metamorphic

Types of Rocks

Identifying Minerals
Mohs Hardness Scale
Crystal Structure
Streak Test
Luster
Cleavage
Fracture
Color
Transparency
Toughness
Specific Gravity

Did you know that...
The Earth is made of rocks and minerals. The Earth is made of rocks and minerals. The Earth is made of rocks and minerals.

Solar Eclipse August 21, 2017

Earth-Moon-Sun Connection

A solar eclipse can only take place at the phase of a new moon, when the Moon passes directly between the Sun and Earth and its shadow falls upon Earth's surface. In a total eclipse, the disk of the Sun is fully obscured by the Moon. In partial and annular eclipses, part of the Sun is obscured.

Geometry of Total Solar Eclipse
The small area where the umbra touches Earth's surface is where a total eclipse can be seen. The larger light gray area is the penumbra, in which a partial eclipse can be seen.

Total Solar Eclipse
A total solar eclipse occurs when the Moon completely covers the Sun's disk, as seen in this 1999 solar eclipse. Prominences can be seen along the limb (in red) as well as extensive coronal filaments.

Partial Solar Eclipse
A partial solar eclipse occurs when the Moon is too far away to completely cover the Sun's disk. In a partial eclipse, the Moon blocks only part of the Sun's disk. (October 23, 2014).

In some ancient and modern cultures, solar eclipses have been attributed to supernatural causes or regarded as bad omens. A total solar eclipse can be frightening to people who are unaware of its astronomical significance, or the Sun seems to disappear during the day and the sky becomes as dark as at night. The image on the right is from Antares Center (1880-1900) depicting the Pagan Philadelphians.

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Interactive Learning

Eclipse or Sun/Moon related activities or books during story time or activity time



Sun Party Events



Adult Programming: Evening or Weekend Scientist talks



Events on the Day of the Eclipse

Eclipse Viewing Training and/or hands-on activities Just Before the Eclipse Begins

Eclipse Party During the Time of the Eclipse



What to Do if it's Cloudy on Eclipse Day



Includes Additional Background Resources

☐ How-to Video (0)

Uses Materials

☐ Rubber Bands (0)

☐ Popsicle Sticks (0)

NEW ITEMS

Climate Change

Environmental Sustainability

[All new items >](#)

TAGS

aerodynamics test

Scale Model of Sun and Earth

This is a lesson about size and scale, also called the Solar Pizza.

[Open Activity](#)

Report broken link

Content Area
Astronomy and Space

Time to Complete Activity
Under 10 minutes

Difficulty Level (by content)
Easy

[View Details](#)

Making a Solar Eclipse Book

This is an activity about how to model and label a solar eclipse.

[Open Activity](#)

Report broken link

Content Area
Astronomy and Space

Age Group
Early Elementary
Upper Elementary

Time to Complete Activity
1-2 hours

Difficulty Level (by content)
Easy

[View Details](#)

How Can the Little Moon Hide the Giant Sun?

This is an activity exploring the concept that distance affects how we perceive an object's size, specifically pertaining to the size of the Sun and the Moon as seen from Earth.

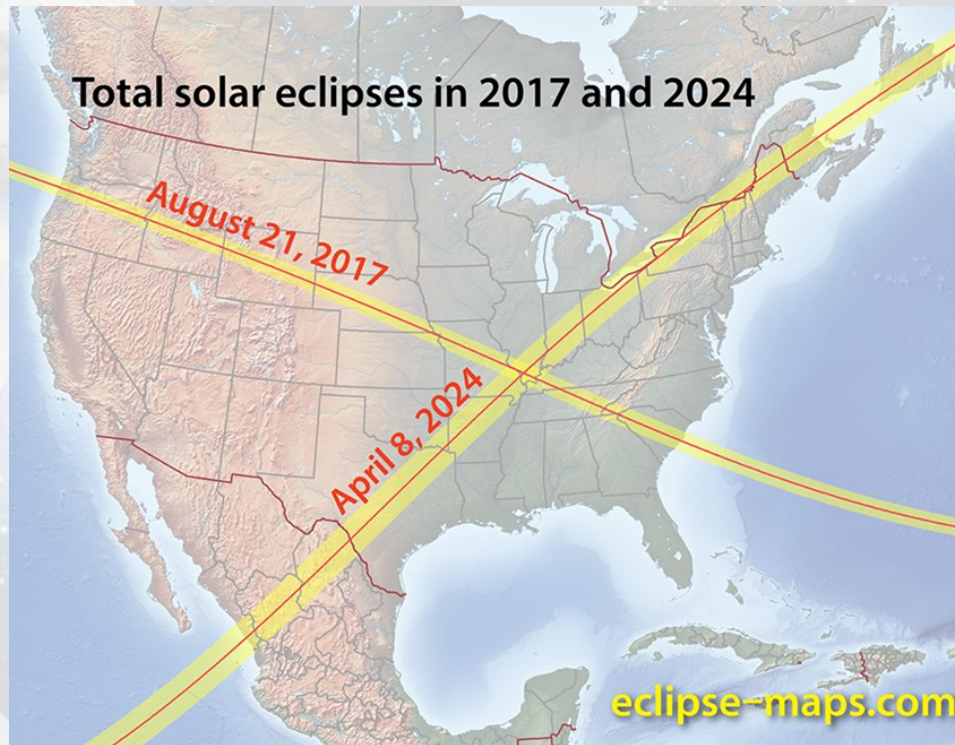
Content Area
Astronomy and Space

Age Group
Early Elementary
Upper Elementary

Time to Complete Activity
40 minutes to 1 hour

- The partial eclipse lasts over two hours, so glimpses of the Sun may be possible as the cloud cover changes
- Have hands-on activities from the *STAR_Net STEM Activity Clearinghouse* on-hand to entertain restless patrons
- Have a video setup ready to access TV and social media sources following the event

What to Do if it's Cloudy on Eclipse Day



Console them by noting the next eclipse going across the U.S. will be on April 8, 2024.

The Challenge: How to Become the Center for Eclipse Information in Your Community



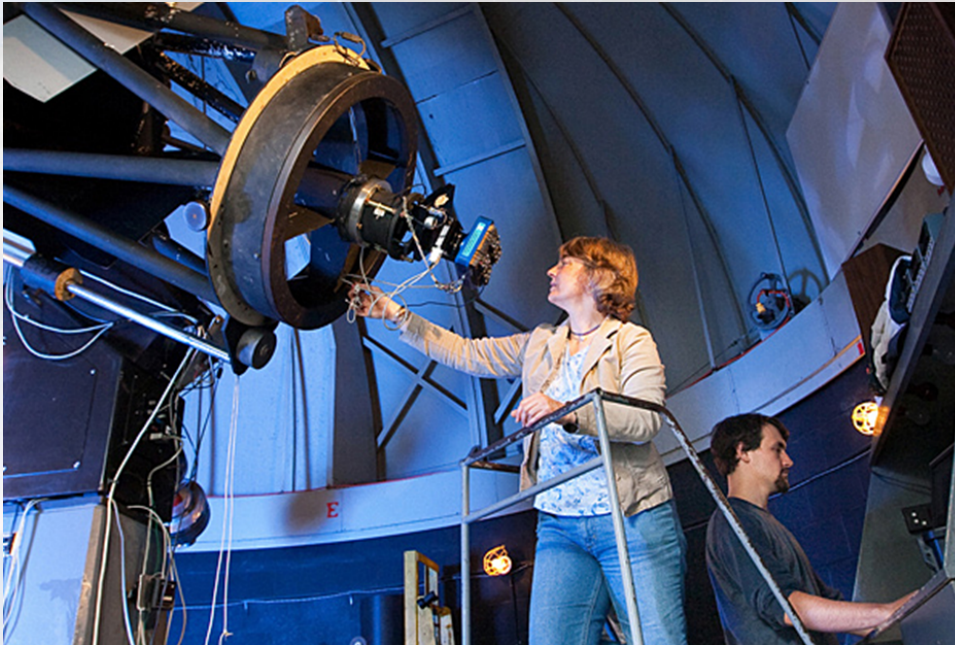


Possible Partners:

- Museums/Science Centers
- Amateur Astronomy Clubs
- Night Sky Network (NASA)
- Park Rangers
- Community Colleges
- University astronomy departments
- Planetariums
- American Astronomical Society
Ambassadors
- Solar System Ambassadors (NASA)
- NASA Centers
- Girl Scouts

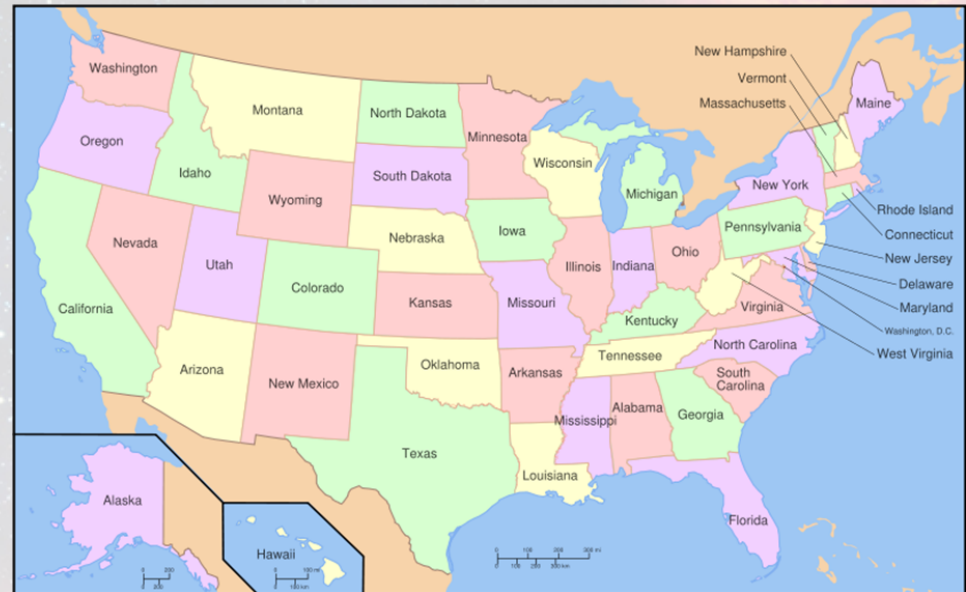
NASA Eclipse Site:
eclipse2017.nasa.gov/





**Ask a Local College or University
Astronomer/Astronomy Student to help.**

They love to share their knowledge!



Community College Finder

Map Search
City Search
Zip Search
Attribute Search

<http://www.aacc.nche.edu/pages/ccfinder.aspx>



Astronomy Ambassadors

AAS AMERICAN ASTRONOMICAL SOCIETY



<https://aas.org/outreach/roster-aas-astronomy-ambassadors>



SOLAR ECLIPSE ACROSS AMERICA

Monday, August 21, 2017: Sun...Moon...You!



AMERICAN ASTRONOMICAL SOCIETY
National Science Foundation



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ECLIPSE AMERICA ▾

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EVENTS & ACTIVITIES ▾

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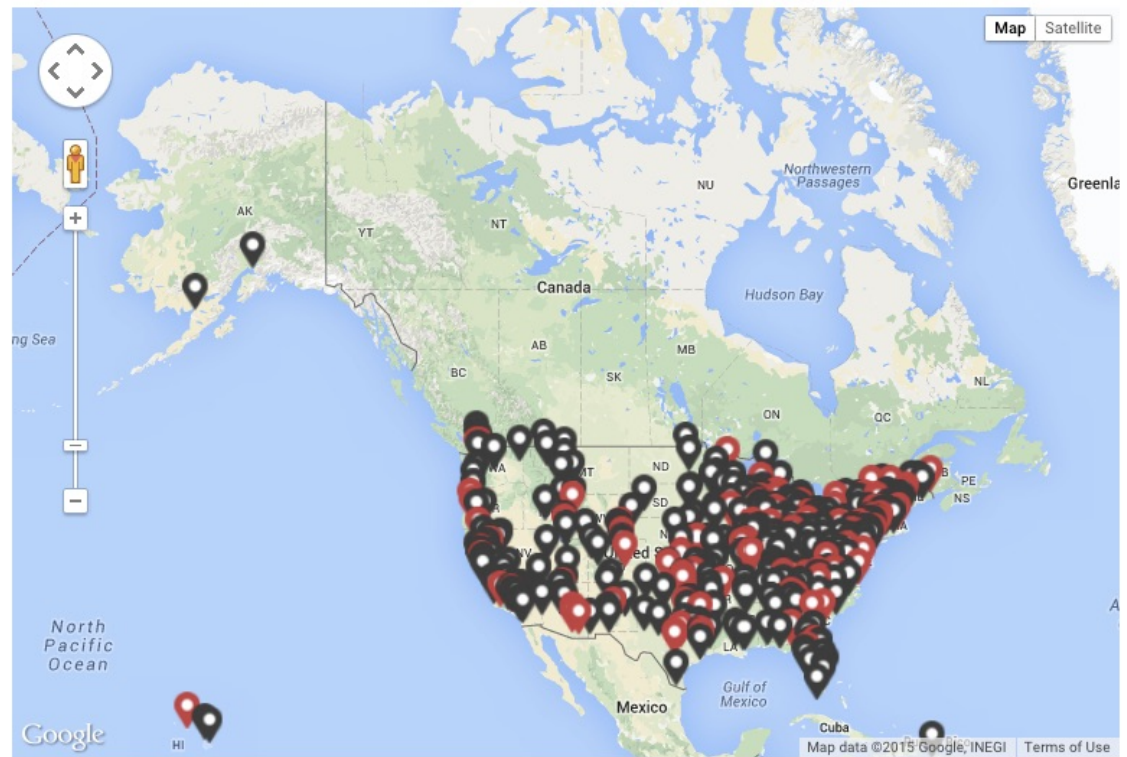
Rick Flenberg / TravelQuest International / Wilderness Travel

<http://eclipse.aas.org>




**Over 400 astronomy clubs around U.S.
doing community & school outreach**

ASTRONOMY CLUBS IN YOUR AREA



This website uses GeolP2 JavaScript from MaxMind.

club with upcoming events Night Sky Network member club



THE ECLIPSE MEGAMOVIE PROJECT

**STICHING TOGETHER
THOUSANDS OF IMAGES IN
REAL TIME**

SUPPORTED BY GOOGLE

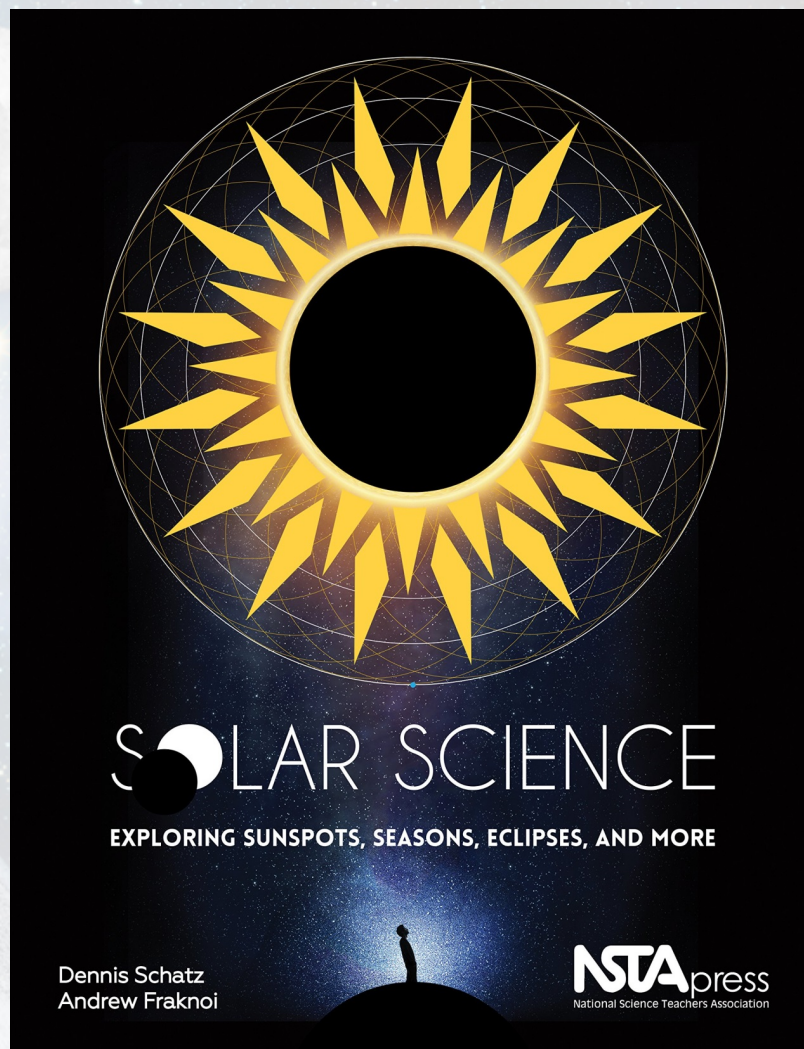
SEE: ECLIPSEMEGAMOVIE.ORG



ASSOCIATION OF
SCIENCE-TECHNOLOGY CENTERS

<http://astc.org>

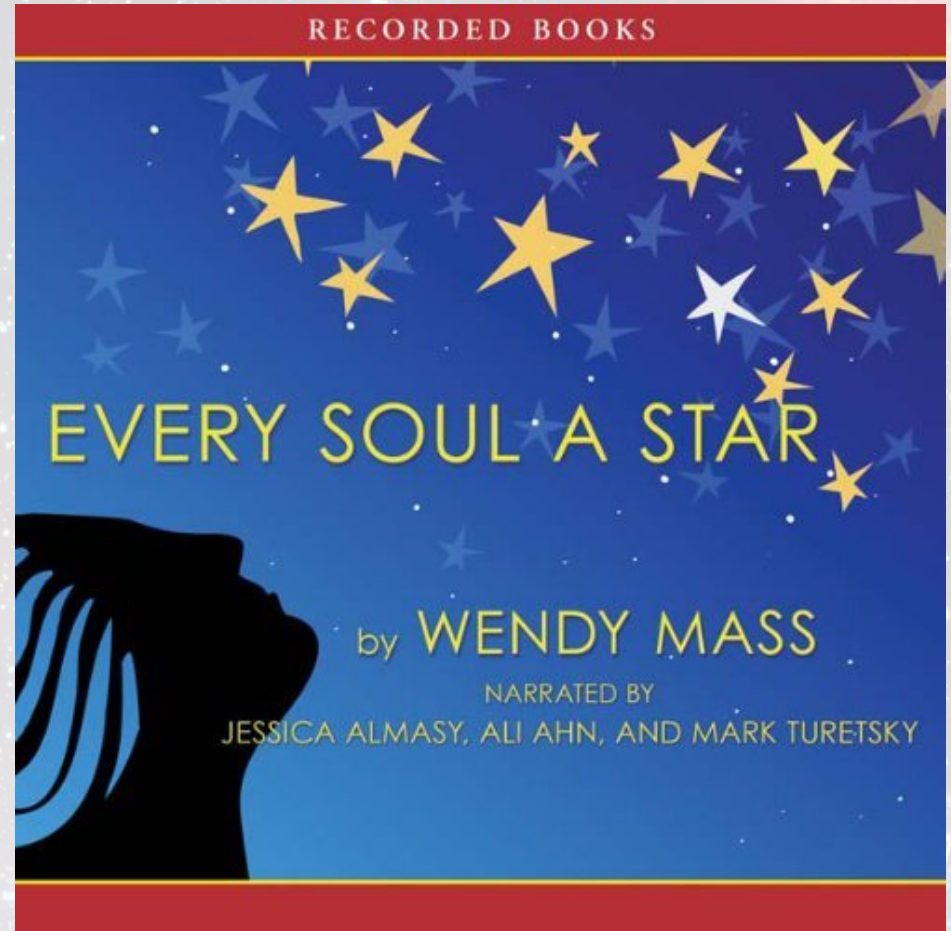
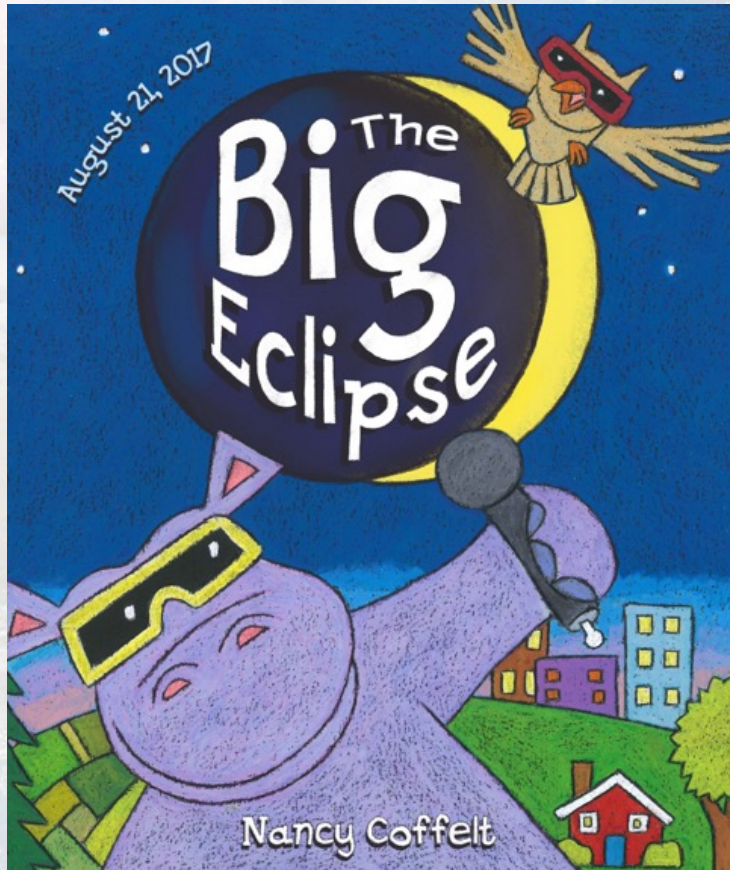


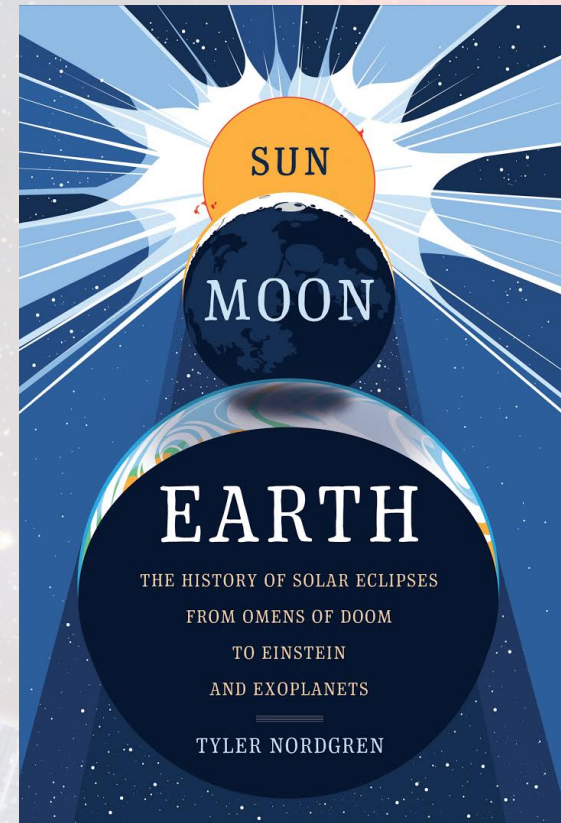
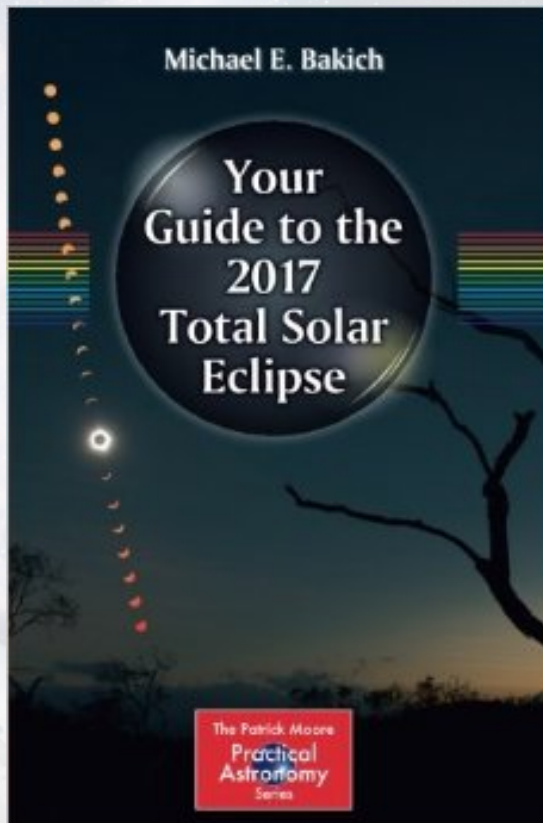


**Coming in
Early 2017**



Print and Audio Books about eclipse related topics





Eclipse Resource Guide:
www.astrosociety.org/eclipse

**Over 2 million eclipse glasses available to
public libraries through partnerships with:**

GORDON AND BETTY
MOORE
FOUNDATION

NASA 
My Library

Google™


RESEARCH CORPORATION
for SCIENCE ADVANCEMENT
A foundation dedicated to science since 1912.

Please watch your inbox for an important announcement about Step 2 on
February 3rd!

Upcoming Opportunities and Currently Available Resources

**NASA@
My Library**

Kit Application opens February 1st at ala.org
Pre-application webinar February 8th

STARnet

Science-Technology Activities &
Resources For Libraries

STEM Activity Clearinghouse

The logo for "Hands-on" features three yellow handprints above the text "Hands-on" in blue. To the right is the "STARnet" logo.
Hands-on STARnet
Tested & Approved STEM Activities



STARnet Webinar Series

<http://www.starnetlibraries.org/>

Questions?