GET READY FOR THE MOST *SPECTACULAR* MOST ACCESSIBLE VISION-RELATED PUBLIC HEALTH EVENT IN HISTORY!

Source: www.ta3.sk/news/archive/archive_sk-q3_2009.php

Total Solar Eclipse

Great American Tour: 21 August 2017*

OR 10:17 PDT (John Day FB NM 2:05)

MT 11:32 MDT (southwest tip 0:45)

ID 11:33 MDT (Rexburg 2:17)

WY 11:35 MDT (Glendo 2:27)

NE 12:58 CDT (Lewiston 2:37)

KS 13:05 CDT (Troy 2:38)

IA 13:05 CDT (southwest tip 0:23)

MO 13:15 CDT (St. Clair 2:40)

IL 13:19 CDT (Golconda 2:40)

KY 13:24 CDT (Hopkinsville 2:40)

TN 13:27 CDT (Gordonsville 2:40)

NC 14:34 EDT (Andrews 2:38)

GA 14:35 EDT (Dillard 2:38)

SC 14:39 EDT (Central 2:38)

Source: www.eclipse2017.org

*local approximate time, example location, and maximum duration [min:sec] of totality in each state

WHAT IS AN ECLIPSE?

1. SOLAR ECLIPSE – When the Earth travels through the shadow of the moon. When the Moon is between the Earth and the Sun.

2. LUNAR ECLIPSE – When the Moon travels through the shadow of the Earth. When the Earth is between the Sun and the Moon.

Types of Solar Eclipses

1. Annual Total – when the moon does not cover the sun completely.
2. Partial – when the moon only covers part of the sun
3. Total – when the moon covers the sun completely.

Eclipse Shadows

1. Umbra – the darkest part of the shadow.

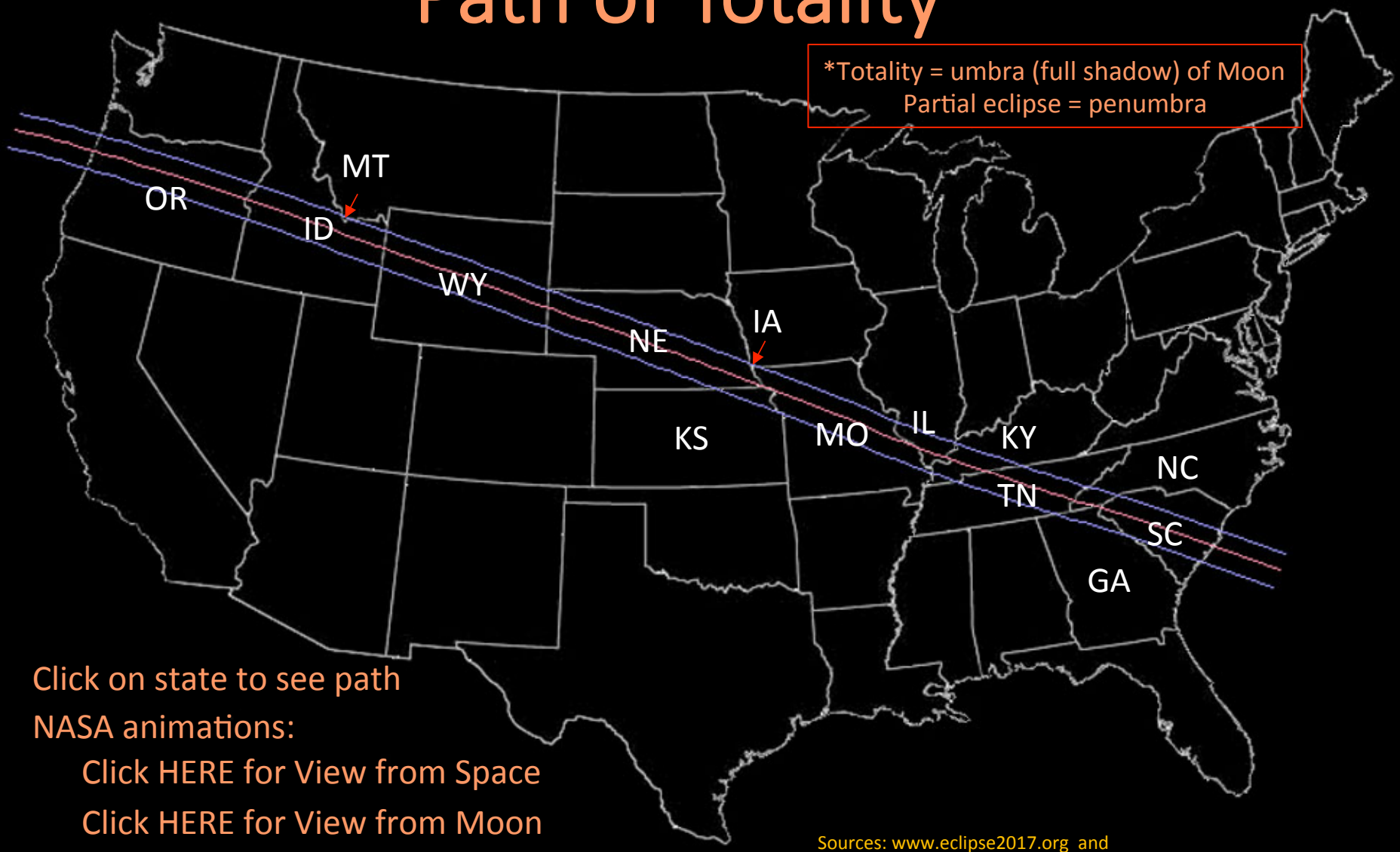
2. Penumbra – the cone of lighter shadow.

How is Eclipse possible?

1. Sun is 400x larger than Moon

2. Moon is 400x closer to Earth than the Sun

Path of Totality*



Click on state to see path

NASA animations:

Click HERE for View from Space

Click HERE for View from Moon

Click HERE for Appearance of Sun

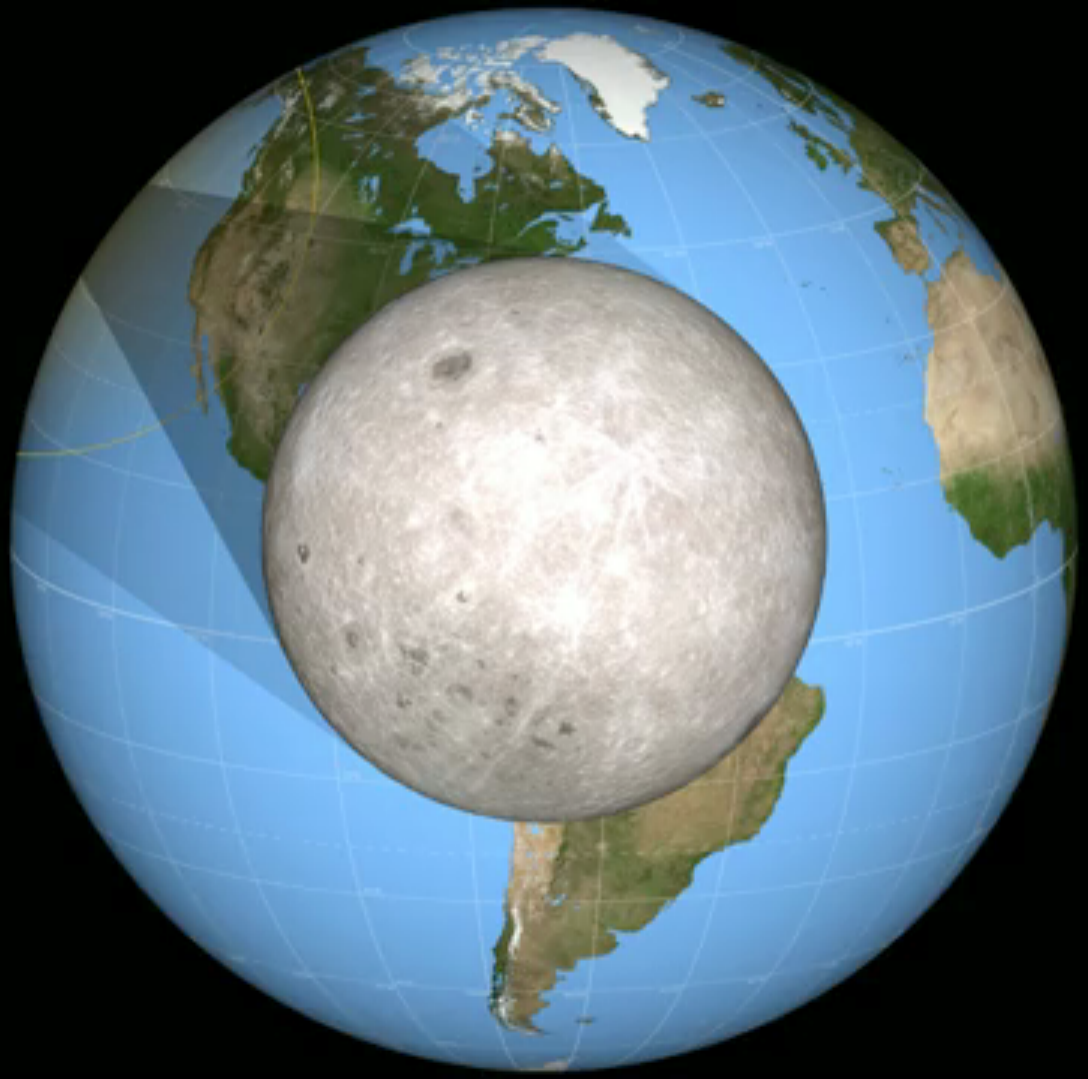
Sources: www.eclipse2017.org and www.greatamericaneclipse.com/nation/

View from space of Earth, Moon, and Sun

Source: svs.gsfc.nasa.gov/4390

Click HERE to return

If video does not play, click HERE for QuickTime free download



View from Moon of umbra (full shadow, total eclipse; black oval) and penumbra (partial eclipse; gray oval) on Earth's surface

Source: svs.gsfc.nasa.gov/4321

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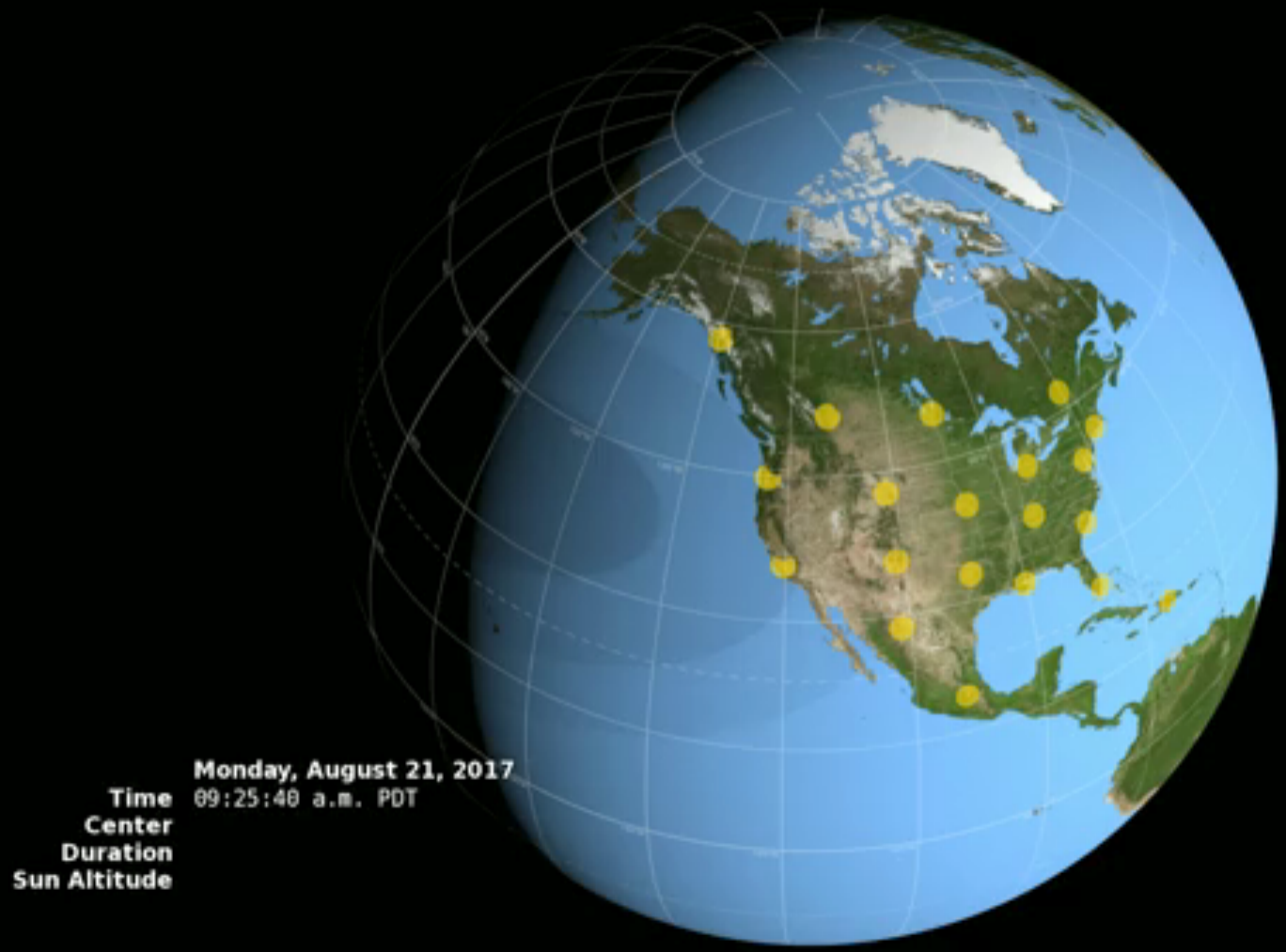

Sun appearance with umbra (full shadow, total eclipse; black oval), penumbra (partial eclipse; gray ovals), and path of totality (red band)

Source: svs.gsfc.nasa.gov/4314

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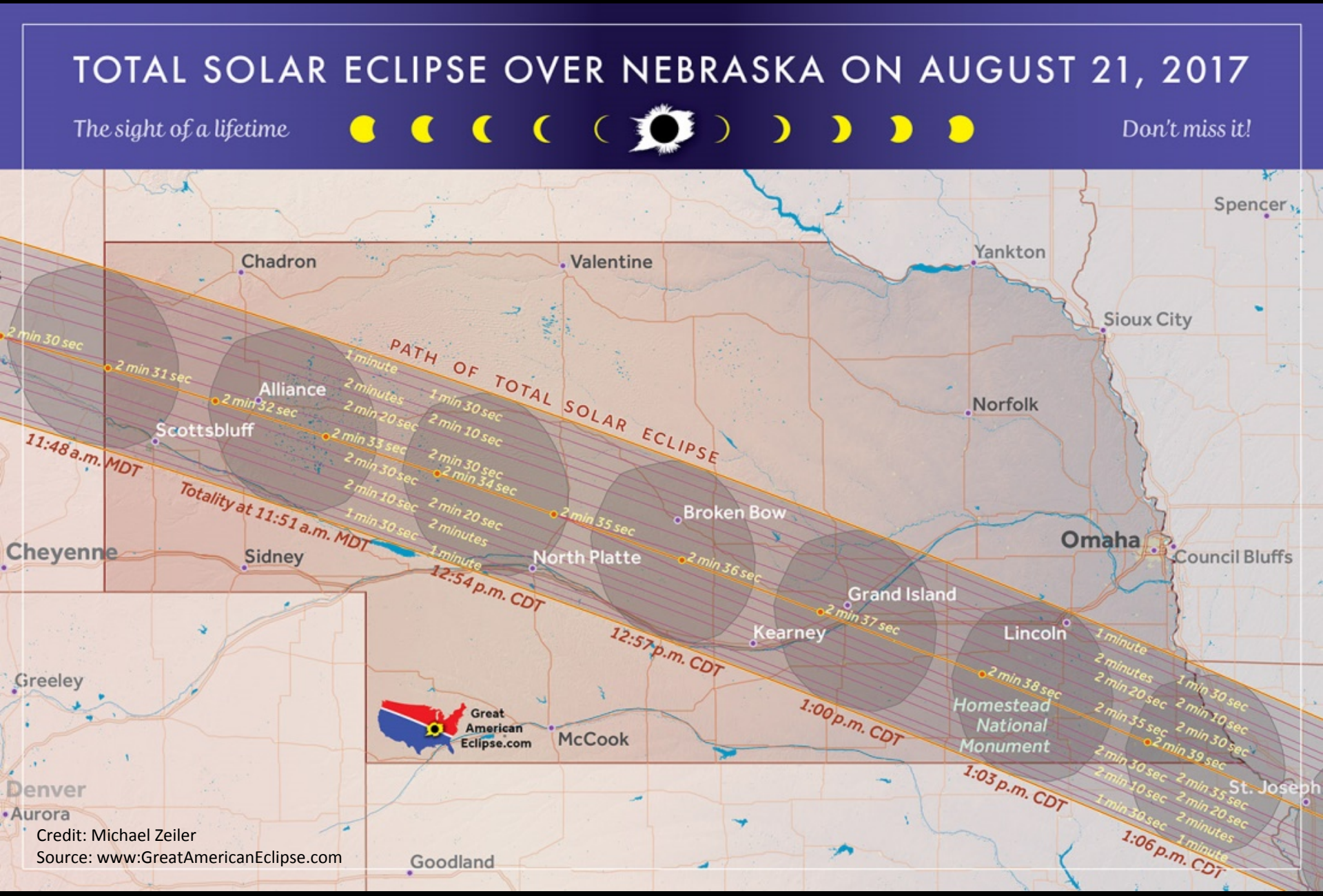


Click on map to return

Stages of Eclipse

1. Contact -1 (C-1) – when moon just starts to cross path of sun.
2. C-2 – When moon covers the sun completely (Total Eclipse)
3. C-3 – End of Total Solar Eclipse
4. C-4 – When moon no longer in front of the sun

FACTS

1. Both Sun and Moon subtend about ½ degree of field of vision: Moon fully blocks Sun during totality
2. Path of totality is about **70 miles** wide
3. About ***12 million people*** live within the path and about ***220 million people*** live within a day's drive
   - This could be the most witnessed total eclipse ever!
4. Totality will last up to **2 minutes 41 seconds**, depending on location
5. May be the event of a lifetime for many people
   - last total eclipse on mainland USA: 1979
   - last total eclipse to cross entire continent of USA: 1918

FACTS

6. During totality:
   - day will seem like night, horizon will look like sunset
   - stars will be visible
   - Sun's atmosphere (corona) and possibly solar flares will be visible
7. Outside path of totality:
   - no obvious change to light level
   - partial eclipse visible ONLY when the Sun is viewed directly . . . through proper eye protection
   - Sun's corona will NOT be visible

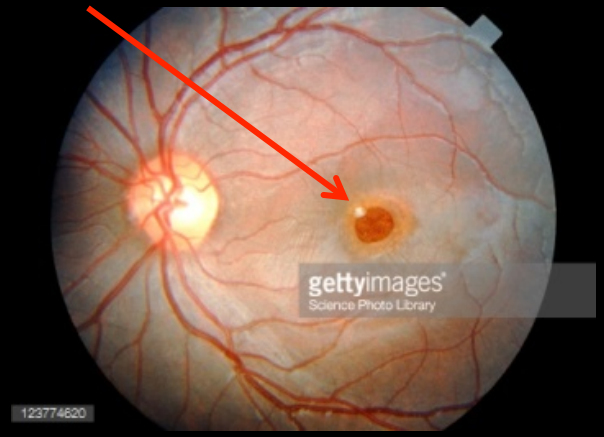
Credit: Robert B. Slobins
Source: eclipse.aas.org

Credit: Evan Zucker
Source: eclipse.aas.org

FACTS

8. Viewing partial eclipse – or Sun above horizon* at any time – *without* proper eye protection can cause:
   - short-term retinal bleaching and discomfort (after only several seconds)
   - potential permanent blindness, i.e., solar retinopathy (after only a few minutes)

*Unprotected viewing of *sunrise* or *sunset* poses no danger



Source: www.gettyimages.com/detail/photo/solar-retinopathy-ophthalmoscope-view-of-high-res-stock-photography/123774620

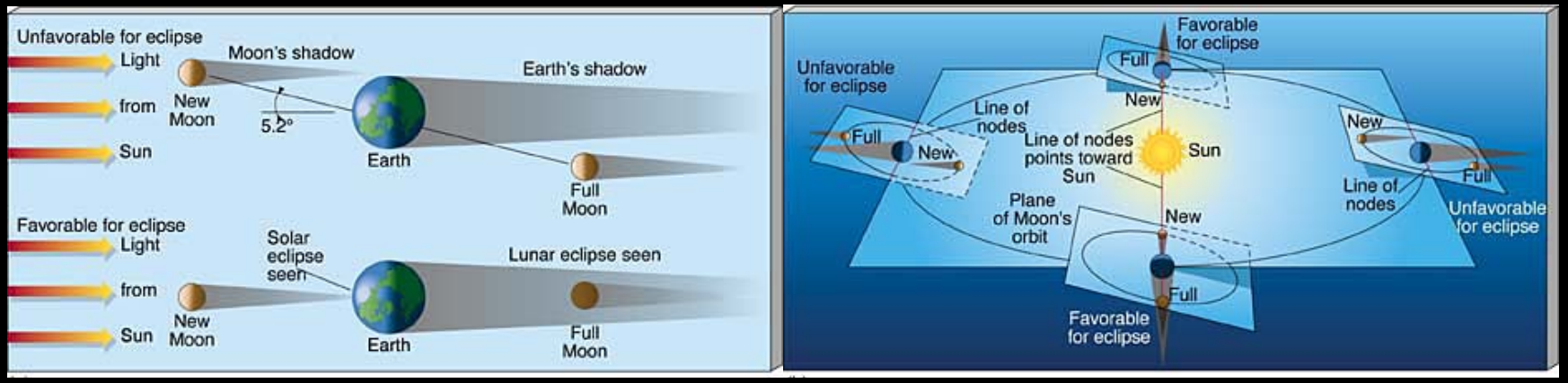
Normal retina:

Source: aapos.org/terms/conditions/106

Animals will not go blind; they have enough sense never to stare at the Sun!

MYTHS!

1. Omen of "evil" or "change"
   - Eclipses are common, but rare *at any particular location*, because orbital plane of the Moon is tilted about 5 degrees from orbital plane of Earth, and rotation of Earth



Source: www2.astro.psu.edu/users/caryl/a10/lec2_2d.html

   - Any connection to human events is purely coincidental; we have known for decades when & how this eclipse would occur; this is ASTRONOMY, not astrology!

Safe Viewing Methods

1. Eclipse glasses or filters
   - MUST be certified as meeting international standard ISO 12312-2:2015 (look for this printed designation)
   - Inexpensive: can cost less than $1 when purchased in bulk

Source: eclipseglasses.com

Credits: Mark Margolis / Rainbow Symphony
Jay M. Pasachoff
Source: eclipse.aas.org

2. No. 14 welder's glass
   - Darkest shade of welder's glass available
   - ONLY shade suitable for viewing an eclipse
   - Moderate: can cost several dollars to several tens of dollars

Safe Viewing Methods

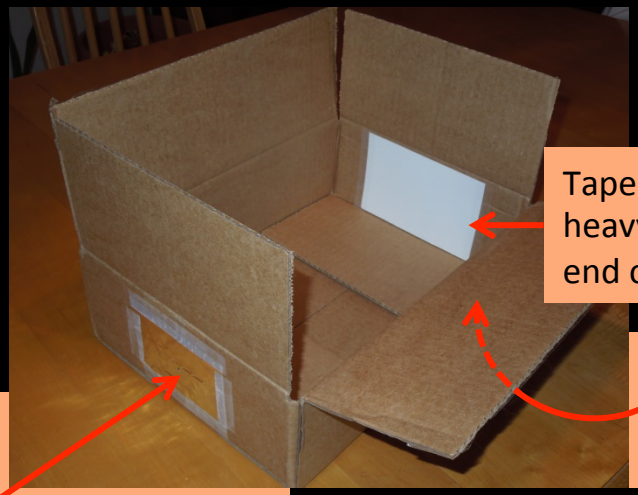
3. Special solar filter for telescope/binoculars/camera
   - MUST be mounted on objective (front) lens(es)
   - Expensive: can cost several tens to several hundred dollars, depending on quality & size

Credits: Mark Margolis / Rainbow Symphony
Paul Deans / TravelQuest International
Source: eclipse.aas.org

   - Do NOT use any filter designed to be placed at *eyepiece* lens
   - Do NOT look through telescope/binoculars/camera without proper solar filter *even if you are wearing eclipse glasses*

Safe Viewing Methods

4. Pinhole camera or projection
   - Can be made from a shoebox or other object; various specific designs and instructions are readily available from numerous sources
   - Very inexpensive: can be made with available materials
   - View *projected* image, do NOT look through pinhole



Tape blank index card or heavy white paper inside end of box as screen

Cut window on side of box to view screen with box top closed

Cut hole in end of box;
Cover with aluminum foil;
Make pinhole (about 1 mm diameter) in foil

Credit: Karl Citek

UNSAFE Viewing Methods

1. Sunglasses, photochromic lenses, post-mydriatic spectacles, or multiples/combinations of these filters
2. Mylar balloons or food wrappers
3. Smoked glass
4. X-ray film
5. Film negatives
6. CDs or other optical media
7. Stacked welder's glass: e.g., Shade 10 + Shade 4 ≠ Shade 14
8. Liquid filters: e.g., coffee, sun tea
9. Solar filter for telescope *eyepiece* lens
10. Telescope, binoculars, or camera *without* objective lens solar filter while wearing eclipse glasses

Source: perkins.owu.edu/solar_viewing_safety.htm

Solar Eclipse 2017

1. Enjoy the once in a lifetime event.

2. Use the solar glasses to protect your eyes.

3. Be aware of how the rest of nature changes during the event. (ie – animals and plants)