

Viewing Eclipses through Cultural Lenses with Dr. Isabel Hawkins



The webinar will begin at 11 am MT and
will be recorded



Agenda

- Introduction/Icebreaker
- Viewing Eclipses Through Cultural Lenses with Dr. Isabel Hawkins
- Resources for Your Library
- Q&A



Viewing Eclipses Through Cultural Lenses

Isabel Hawkins, Ph.D.

Astronomer and Senior Scientist
Exploratorium, San Francisco, CA

March 12, 2024



When it comes to eclipses...

the experience can mean different things to different people.



A few things to remember when working cross-culturally...

**Learn about yourselves, your
community or communities, and
contexts...
by contacting cultural bearers.**

**Be reciprocal...
with your communities and the
Earth.**

**Understand constraints...
and honor clear expectations for all
involved.**

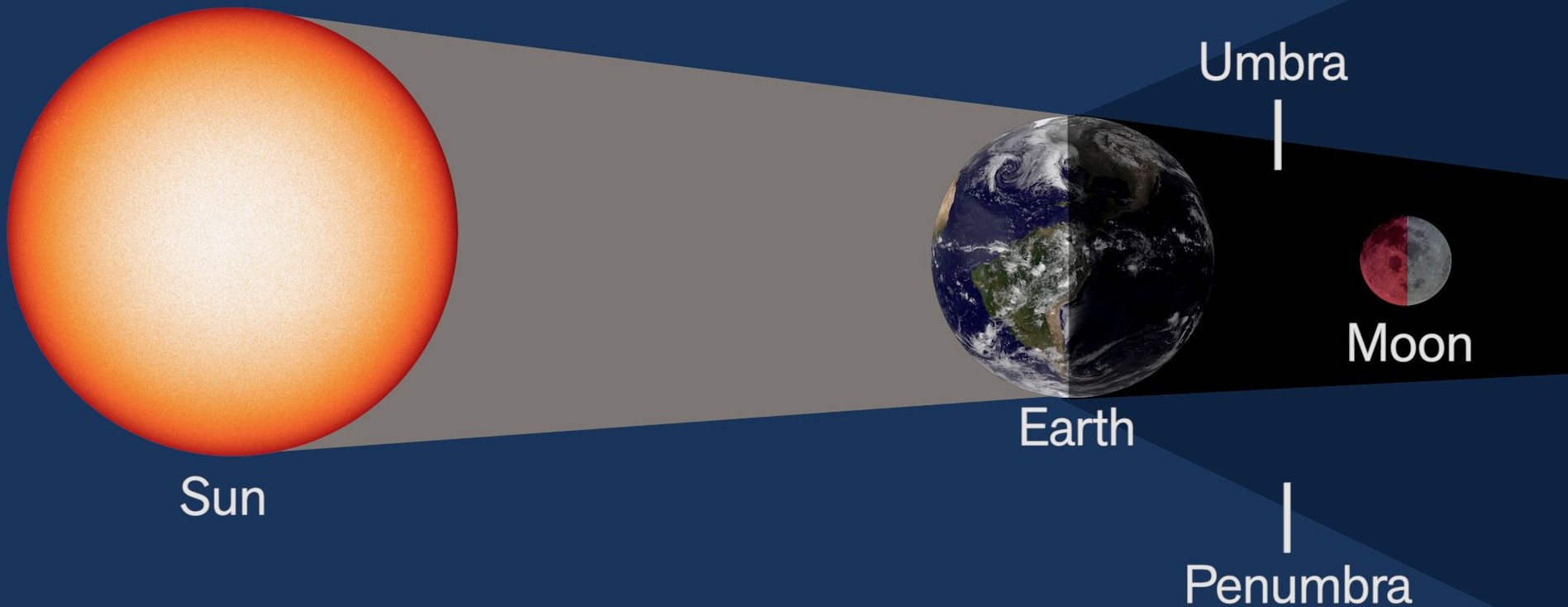
**Celebrate together...
to affirm collective wellbeing.**

Mistakes will be made...
If you make a mistake, apologize, learn from it, and keep up the good work.

Lunar Eclipse



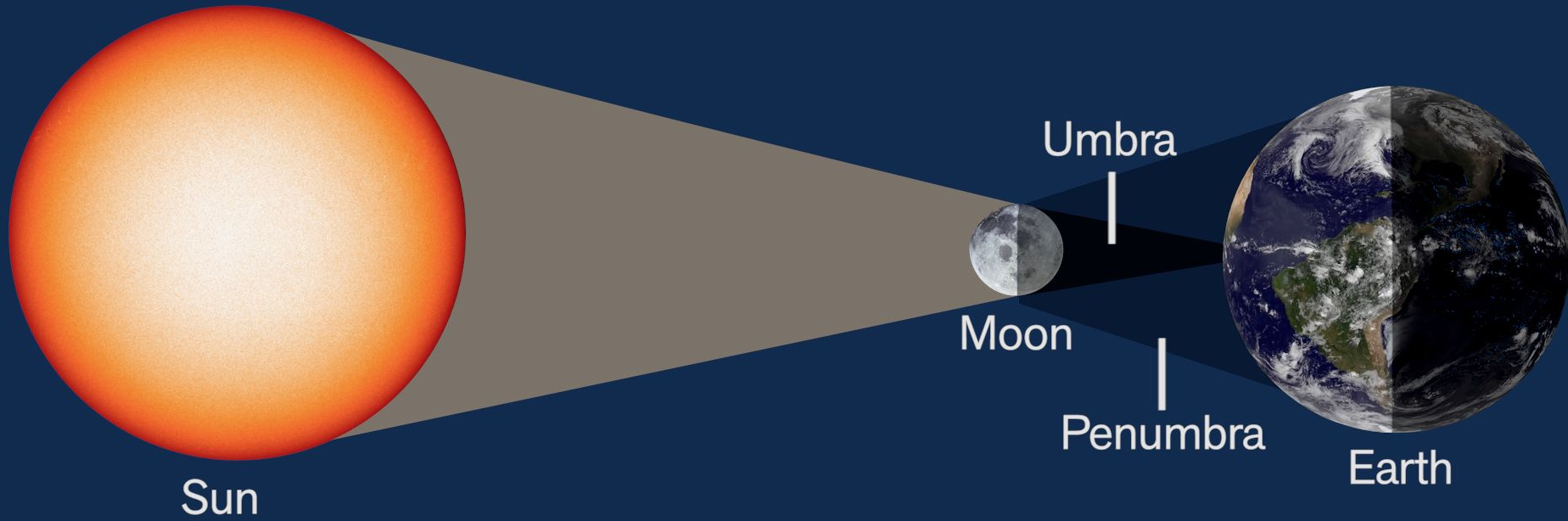
Lunar Eclipse



Solar Eclipse



Solar Eclipse



Solar Eclipse

April 8, 2024



March 24–25, 2024 — Penumbral Lunar Eclipse — San Francisco

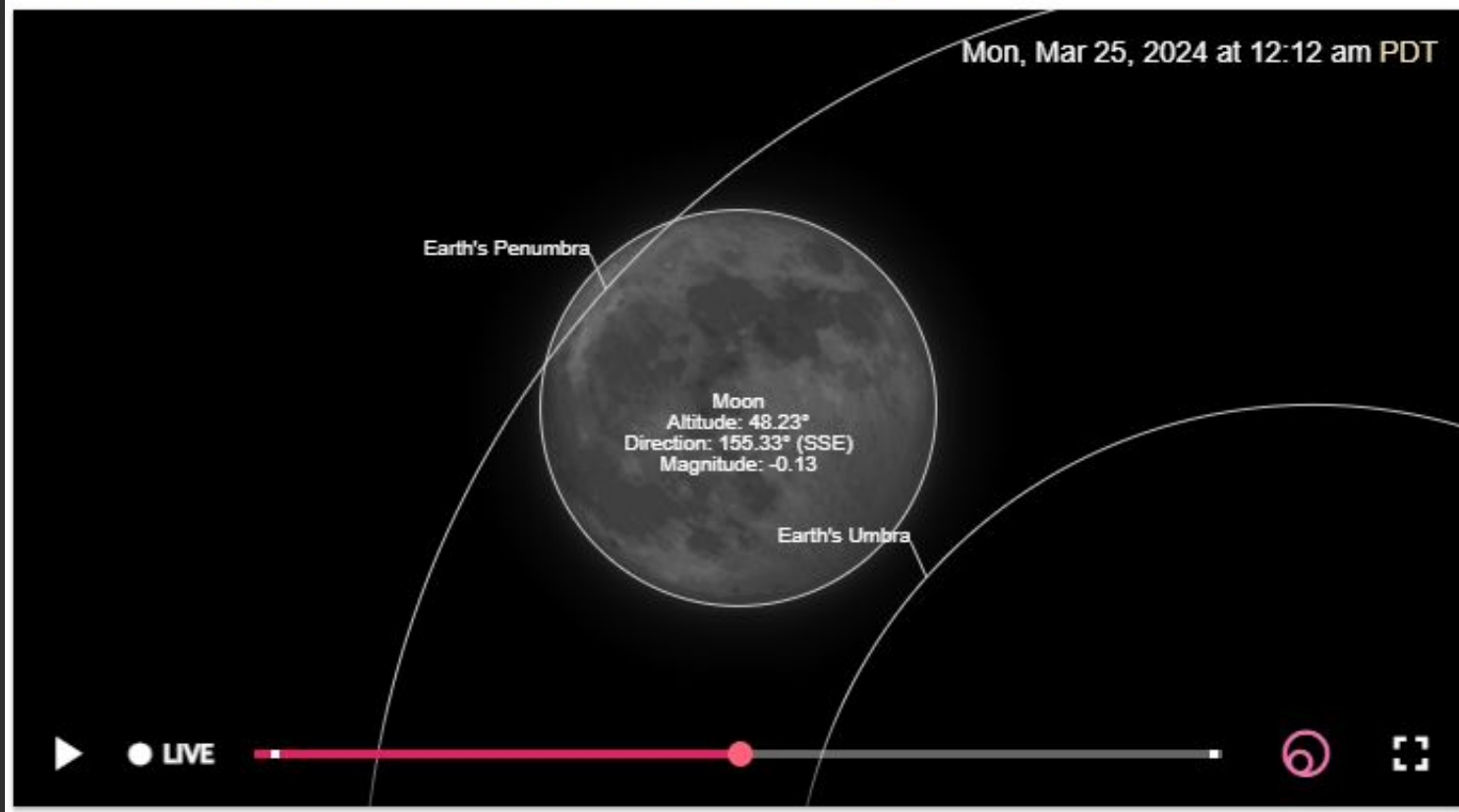


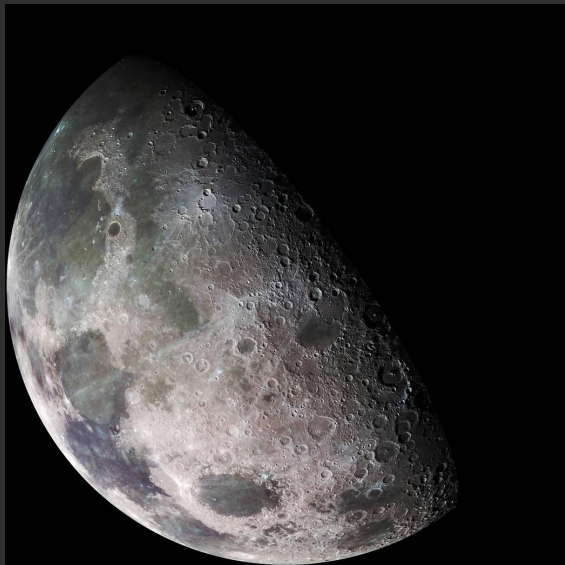
Image credit: timeanddate.com



**Mother Moon participants
observing the total lunar
eclipse of Nov 8, 2022**



Observing the Moon during the day at the Ki'kotemal Maya Community School in Guatemala



Never Observe the Sun with a telescope or binoculars unless they have special solar filters – you can burn a hole in your retina!





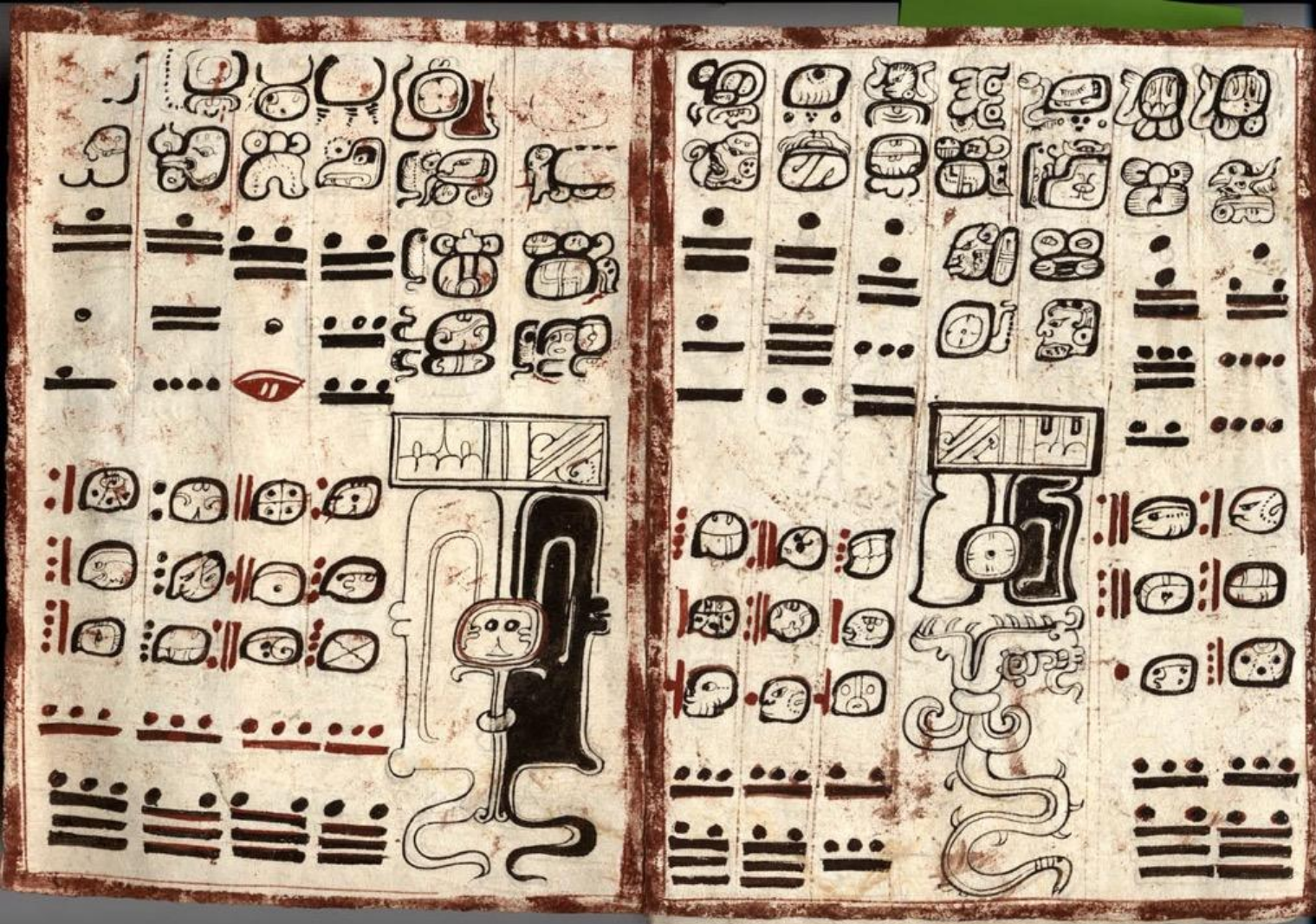
**K'iche' Mayan
Language
Astronomy
Books for
Children
Written by
K'iche' Maya
People**



**Maya
Astronomer**



Maya Calendars



Maya
Eclipse
Tables



**The Sun and the Moon
in the Popol Vuj
Maya Origin Story**

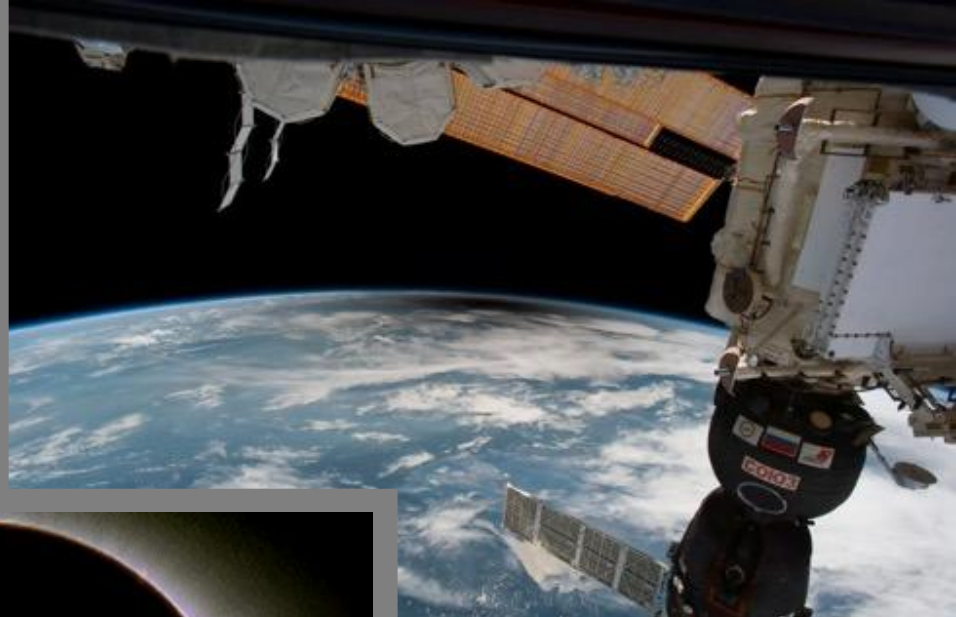


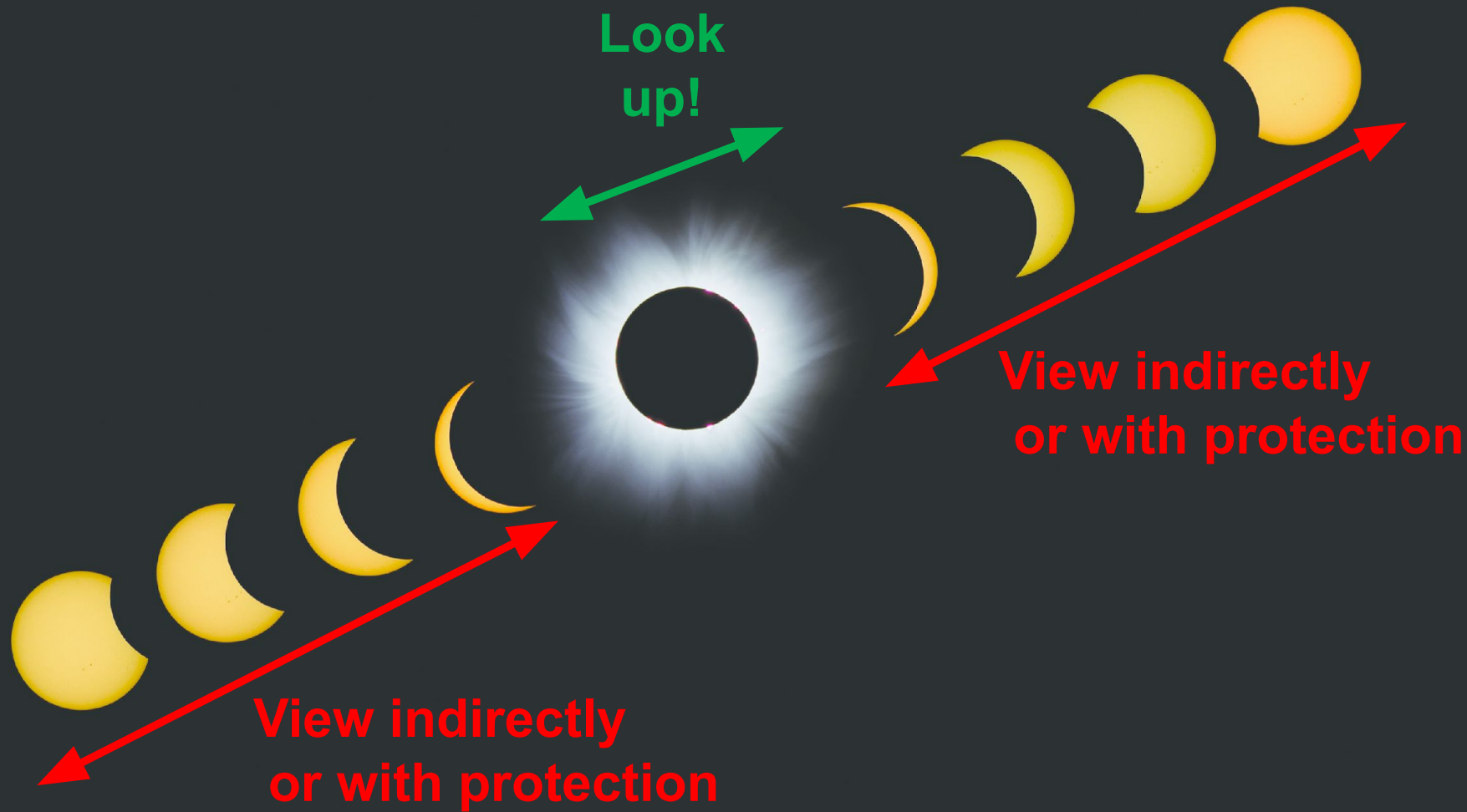
**A Maya Funerary Plate
is an Astronomical
Chart**

A Maya Vase is an Astronomical Chart

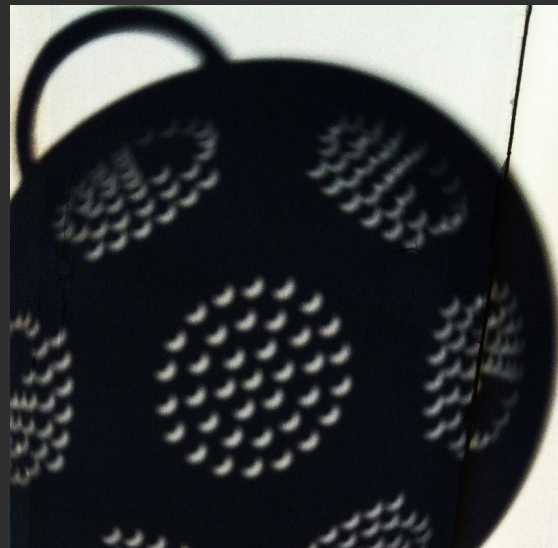








Safe Observations of a Partial Solar Eclipse





Live Solar Eclipse Production and Transmission



Partner



Featured Collaborators

Nancy Maryboy, Ph.D.

Diné (Navajo) and Tsalagi (Cherokee)

Navajo Astronomer

President, Indigenous Education Institute (IEI)

Affiliate Professor, U. Washington

David Begay, Ph.D.

Diné (Navajo) and Pueblo

Navajo Astronomer

Vice President, Indigenous Education Institute (IEI)

Associate Professor, U. New Mexico





Diné (Navajo) Worldview of the Universe

- Observation,
place-based knowing
- Knowledge lives in
traditional language
- Process – a world in
motion
- Inter-relationship of all
things





Jóhonaa'ei dóó Nahasdzaán dóó
Tí'ehonaa'ei alk'áaniikahgo, Jóhonaa'ei
Tí'ehonaa'ei bichaha'oh áyil'íih
Nahasdzaán bikáa'í. Éiyee lahgo át'til'íih.

The interaction and alignment of the Sun and the Moon create a shadow (bichaha'oh) on the Earth, causing an eclipse.

- | | | | |
|---|---|--|---|
| 1. Jhōnānā'ē lahgo at yīyāw.
The Sun made itself different. | 3. Jhōnānā'ē jōo Trēhōnā'ē
ak-ōōō' nāhāch.
The Sun and the Moon aligned
with each other. | 5. Trēhōnā'ē shā be
adidin binast' i' sēll.
Sunlight goes at the way around
the Moon in a ringlike shape. | 7. Jhōnānā'ē lahgo
st' yīyāwēgē hānsādz.
The Sun came back out of
the eclipse. |
| 2. Trēhōnā'ē yīyāw.
yichān āō yīyāw. Jhōnānā'ē
be astindine adin sēll.
The Sun ceases to exist with
a full light. | 4. Jhōnānā'ē Trēhōnā'ē
yine yīyā.
The Sun went behind the Moon. | 6. Trēhōnā'ē Jhōnānā'ē
akōōō yīgān nīnīyā.
The Moon completely covered
the face of the Sun. | 8. Trēhōnā'ē
dōo Nāhādzāān
bichāhōō yīyāw.
In shadow—of either
the Moon or the Earth. |

ANNULAR SOLAR ECLIPSE | October 14, 2023



EXPLORATORIUM.EDU/ECLIPSE

Why Study Eclipses?

Traditional Pasévo knowledge teaches us that eclipses have always been a part of the human experience. Eclipses help us understand the eternal, cyclical relationship between the Sun, the Moon, and the Earth.

When a space is used, they are considered a little bit renewed. That's why it is important to know about us spaces.

During an eclipse, Nanto elders strongly instruct our community to go inside the hogan (our traditional dwelling) to ensure we don't look up at the Sun. It is considered a time of intimate communication between the Sun and the Moon.

We sit quietly and in contemplation, or recount traditional teachings about the origin of the Sun and Moon. These practices are grounded in our deeply held respect for the cosmic order.

Traditional Navajo teachings, too, warn that looking at the Sun can damage eyes and cause other health problems.



Traditional thought teachings in that culture are a form of yoga and contemplation, often done inside the home.

Science, eclipses, and shadows (bichaha'oh)

It is important to understand what causes eclipses, which are about shadows (Sachasatwa). A solar eclipse occurs when the Moon moves between the Sun and Earth. The Moon blocks our view of the Sun and casts a shadow on Earth. When the Moon completely blocks the bright face of the Sun and daytime turns into darkness, that is known as a total solar eclipse.

During partial and annular eclipses, the Moon does not completely cover the Sun, so the daytime light is only slightly dimmed. During an annular eclipse, the Sun appears to be a bright golden ring blazing around the Moon. It is important to protect our eyes during an eclipse. But with proper precautions, it is safe to view an eclipse.



Annular solar eclipse in Navajo Country

The October 16, 2003, Annular Solar Eclipse will be visible from Madison County.

and the Express website or app.



NASA, along with the Exploratorium, and the Indigenous Education Institute, will broadcast the *Annular Solar Eclipse* of October 14, 2023, in a live stream transmitted through the Internet.



Path of Annularity



Check what Else Holiday's return books include the *price* of a total value coupon.

Eye safety during a solar eclipse

Never look directly at the Sun without protective eyewear.

Deigaster aurigaster, even dark zones, will NOT project gray tones while observing a solar eclipse during its partial phase, nor while observing an annular solar eclipse.

The CHEF way to safely observe a better output is to use optically certified viewing glasses (around \$2 each). Ask a local store to acquire them.

During a total solar eclipse, there is ONE period of time when scientists tell us it is safe to look at the Sun with the naked eye, and that is during totality, when the Moon (706,900 km) covers the Sun.

This phase lasts only a few minutes. During totality, the outer atmosphere of the Sun, called the corona, will be visible and can be viewed safely without special glasses. (Note: The brightness of the corona is equivalent to that of the full Moon, so it will not hurt your eyes.) Viewing the corona during a total solar eclipse is a unique and unforgettable experience.

It's also easy to view the eclipse on a computer or watch the eclipse through the Exploratorium's eclipse app on your smartphone.

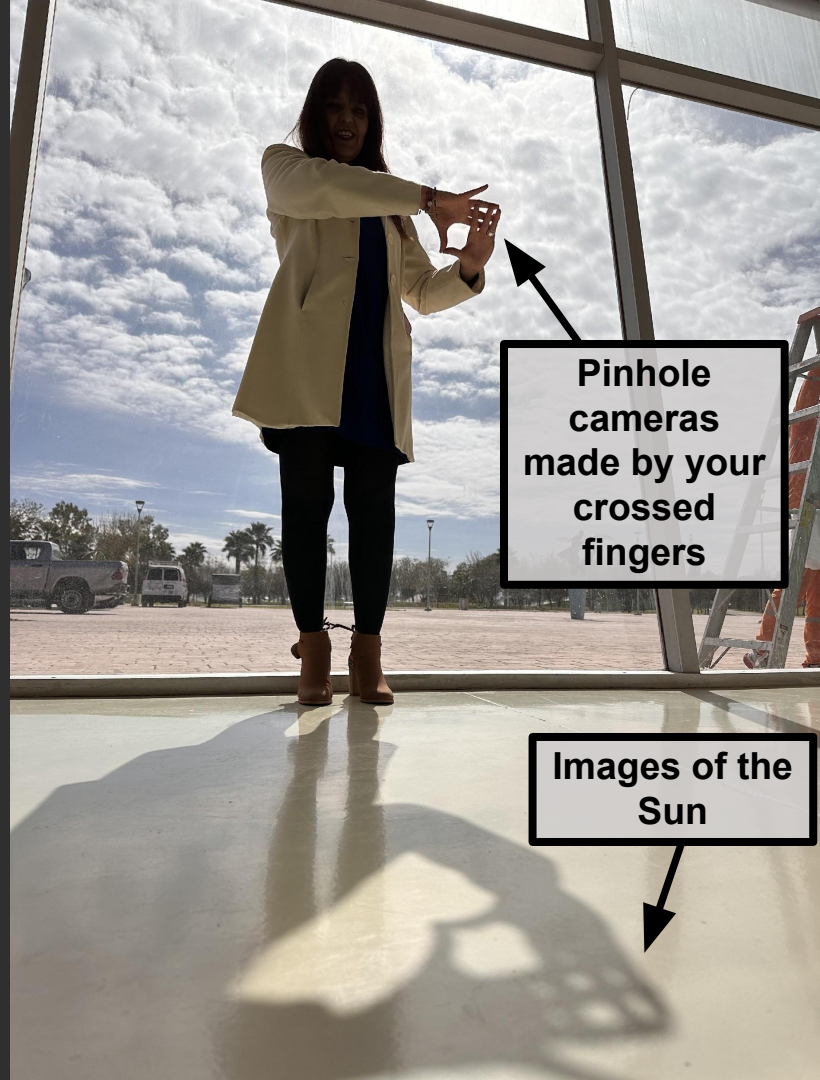


EXPLORATORIUM.EDU/ECLIPSE

For more information, please contact: Michael J. Fox, Fox Foundation, 100 West 17th Street, 11th Floor, New York, NY 10011-4209. Tel: 212-850-6000. Fax: 212-850-6001. E-mail: mjfox@foxfoundation.org. Web: www.foxfoundation.org.



You can make pinholes!



Pinhole
cameras
made by your
crossed
fingers

Images of the
Sun

Eclipse glasses clothesline!



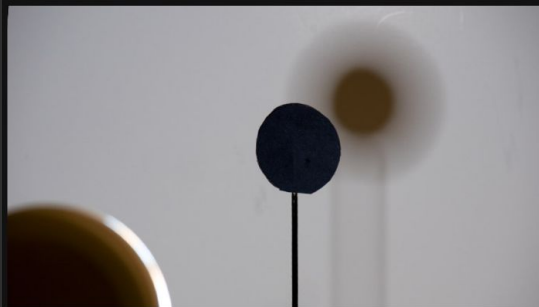


Science Snacks: eclipse



Cosmic Coincidence

Discover the "cosmic coincidence" that makes solar eclipses possible!



Eclipses of the Ring Light

A ring light stands in for the Sun.



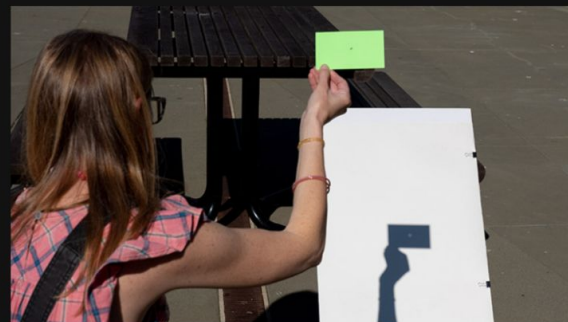
Eclipse to Scale

Make a scale model of a total solar eclipse!



Solar Eclipses

Use your thumb to eclipse your friend!



Spot the Sun

Safely view our nearest star.



TOTAL SOLAR ECLIPSE

April 8, 2024

3 Free LIVE Transmissions

- Telescope only (no narration)
- Educational program – English
- Educational program - Spanish



exploratorium.edu/eclipse

Torreón,
Coahuila, MX
&
Junction, TX, USA



Free Eclipse App
Android and iOS



exploratorium

Thank you!

exploratorium.edu/eclipse



Resources for Your Library



La STAR Library Network presenta

ECLIPSES SOLARES de 2023 y 2024

Un “doble título” norteamericano

Una guía para las bibliotecas
públicas y sus comunidades



Books



Traditions of the Sun eBooks

- A Photographic Journey to the Yucatán
 - Trilingual (Yucatec Mayan, Spanish, English)
 - Tsotsil Mayan
- The Sun-Earth Connection at Chaco Culture National Historical Park
 - English
 - Spanish



XÓOK K'IN

Le dachben Maya'ob tu kana'ob ku xokoo'ob le k'ino'ob tu yilajo'ob t'ux ku jil kan ja'ok beixan tu yilajo'ob u jul le kan t'ub'uk, ka tu d'zajo'ob u chikil tu'ux k'itko'ob u lubul chae' yéetel u tal y'ax k'in ja'ab un ja'ab Yucatán.

Beyo' tu kana' u t'ubul u xoko'ob le beyili'ob, tu mentajo'ob jamp'etel u poopil xook k'in jach chuka'an ut'fal u k'in u paka'ob, beixan ut'fal u k'inbesik u k'it'ch'ana'ob. Le aj mats'o'ob ku xoko'ob le dachben j'ut'el soy k'ajob (arqueólogo) yéetel le aj mats'o'ob ku xoko'ob u ek'lo'ob ka'an (astrónomo) dzook yilko'ob' bix u jul le k'in dzedzek ja'abun ja'ab'o'ob u k'inlo'ob u bohatko'ob u tal lool le che'ob'ob u banal u le' che'ob'ob. Le u tojil u julo'ob ku bohatik leyl' u k'in'o'ob chae' yéetel y'axin.

LAS ESTACIONES DEL AÑO

Los antiguos Mayas observaron el Sol y notaron los puntos de salida y puesta de nuestro astro durante el año, para marcar las épocas de lluvia y sequía en Yucatán. A través de observaciones cuidadosas de la naturaleza, desarrollaron un calendario altamente preciso para organizar su agricultura, rituales y celebraciones.

Arqueólogos y astrónomos han notado que muchas estructuras Mayas están alineadas con el Sol en varias épocas del año, especialmente en la primavera y otoño. Estas alineaciones anticipan las temporadas de lluvia y sequía.

THE SEASONS OF THE YEAR

The ancient Maya watched the Sun and noted where it rose and set throughout the year to mark the rainy and dry seasons in the Yucatán. Through careful observations of the natural world, they developed a highly accurate calendar to organize their agriculture, rituals, and celebrations.

Archaeologists and astronomers have noted that many Mayan structures align with the Sun's position at various times of the year, especially in the spring and fall. These alignments anticipate the wet and dry seasons.

U' chook'u u p'ek'it'o'ob bix ch'au'it' le w'ach'o'ob' k'in' t'at'an tu' t'ook u ut'alal k'in'it'el ja'w'a'.
Más información sobre las imágenes en estas páginas se encuentra al final del libro.
More information about the images on these pages can be found at the end of the book.



Maya Constellation cards

What do you see in the sky?

This Maya constellation from the Guatemalan highlands is the *Seven Macaw* (*Big Dipper in Greek Mythology*.)

7 bright stars make up the body and tail of Seven Macaw, a bird who is arrogant and brags about his dazzling light.

In the Guatemalan highlands, the constellation disappears below the horizon for part of each night due to the tilt of Earth's axis.

According to Popol Wuj, the Maya origin story, the disappearance of the constellation symbolizes how the hero twin (the Sun and the Moon) punishes arrogance by taking away his



¿Qué ves en el cielo?

Esta constelación maya del altiplano guatemalteco es La Siete Guacamayo (*Osa Mayor en la mitología griega*).

7 estrellas brillantes componen el cuerpo y la cola de Siete Guacamayo, un pájaro que es arrogante y se jacta de su deslumbrante luz.

En el altiplano guatemalteco, esta constelación desaparece bajo el horizonte parte de cada noche debido a la inclinación del eje de la Tierra.

Según Popol Wuj, la historia de origen maya, la desaparición de la constelación cada noche simboliza cómo los gemelos héroes JunAjpu' y Xb'alamke (*el Sol y la Luna*) castiga a Siete Guacamayo por su arrogancia quitándoles su luz brillante.



Siete Guacamayo



Learn and Share



Native Skywatchers Virtual Event on Mayan Astronomy

- Dresden Codex
- Mayan Eclipse Cycles
- NASA Astronaut Jose Hernandez
- Accompanying PDF Booklet

Popul Vuh Animated Documentary

- Alexander Street Academic Video Online
(English/Spanish)
- YouTube

Ways of Knowing: Eclipses Around the World

- Slides/Cards from Night Sky Network Eclipse Ambassadors
- Images and eclipse stories from Mexico, Uganda, Korea, Chile, Scandinavia, and more

Bahmia

Two phrases are used to describe an eclipse of the Sun “Eizooba kyakira” (eyes-oh-ba chi-a-kila) which means the Sun is dark and “Eizooba kyeshereka” (eyes-oh-ba chi-eh-shay-leka) which means the Sun hides. The Bahima people refer to the Sun's halo as “ekikaari ky'eizooba” (eh-chi-kah-all chi-eyes-oh ba) meaning the enclosure of the Sun. This shows that the Bahima people witnessed total eclipses of the Sun, for during a total eclipse the Sun's halo is visible.

Ways of Knowing:
Solar Eclipses
Around the World

Uganda

Image credit: “The monument to the Pakwach eclipse, Igongo Cultural Center/Voice of America
Text credit: Dr Jarita Holbrook

A diagram showing a circular monument with a yellow and black sun symbol on top of a stone base. A red line connects this monument to a red dot on a world map, which is also enclosed in a red oval.

STAR Net Bilingual Eclipse Resources

- English/Spanish resources from STAR Net
- Webinar recording on STAR Net YouTube Channel
- Bilingual hands-on activities, resources, and more
- Link to recording and more in link bank

Q&A

