Eclipses and the Sun

Dr. Michael Kirk, NASA HEAT's Principal Investigator

Carolyn Ng, Informal Education Specialist

Find more: solarsystem.nasa.gov/eclipses

Saturday
October 14, 2023

Monday
April 8, 2024

Partial in all 48 states

Credit: NASA

Annular Solar Eclipse
October 14, 2023

Total Solar Eclipse
Monday, April 8, 2024

ECLIPSE
THROUGH THE EYES OF NASA

Visit solarsystem.nasa.gov/eclipses/home/

2024 Total Solar eclipse
THROUGH THE EYES OF NASA

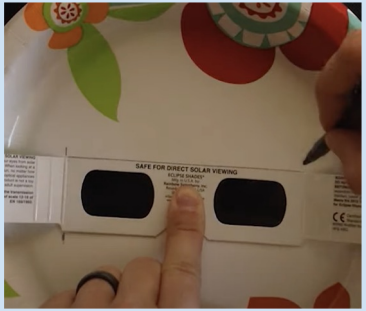
Partial Solar Eclipse

You must look through **safe solar viewing glasses** (“eclipse glasses”) or a safe handheld solar viewer at all times.

Eclipse glasses are NOT regular sunglasses; regular sunglasses, no matter how dark, are not safe for viewing the Sun.

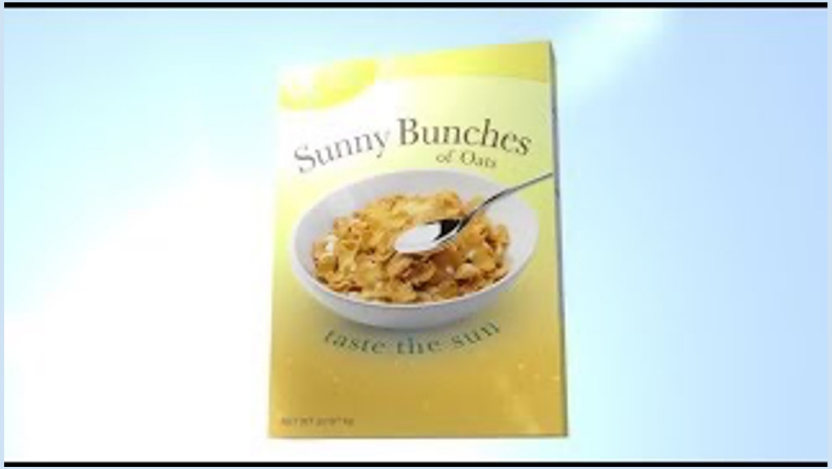
A huge group of sunspots, about the size of Jupiter, appeared on the Sun during a partial solar eclipse over Santa Cruz, California on October 25, 2014. *Credit: Astronomy Picture of the Day, Michael Bolte (UCSC)*

Glitter and Glam with Solar Eclipse Safety

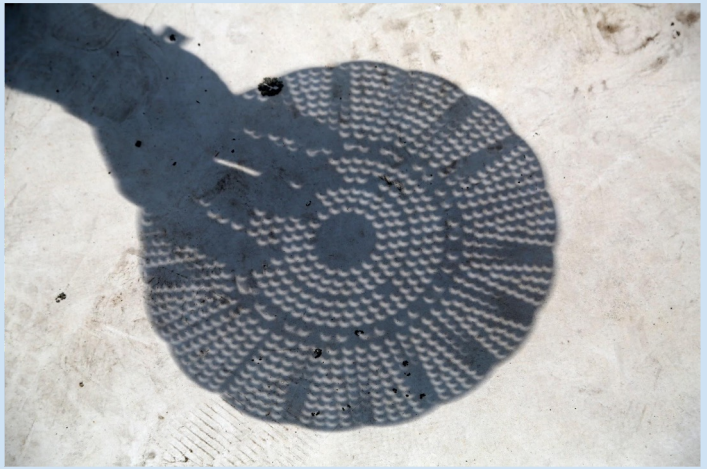


This activity is not yet in our database, but will be added soon!

Pinhole Projector Activities



Build a cereal box pinhole projector
Credit: NASA



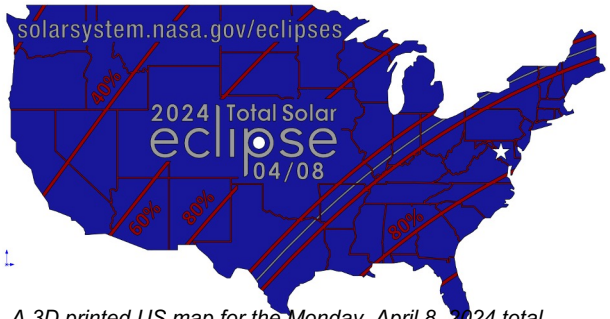
Allow light to filter through a colander to project many partial solar eclipse images on the ground. Credit: NASA/Joy Ng

USA NASA Pinhole Projector Activity

Your back should always be to the Sun when using a pinhole projector. Do NOT look at the Sun through the pinhole!

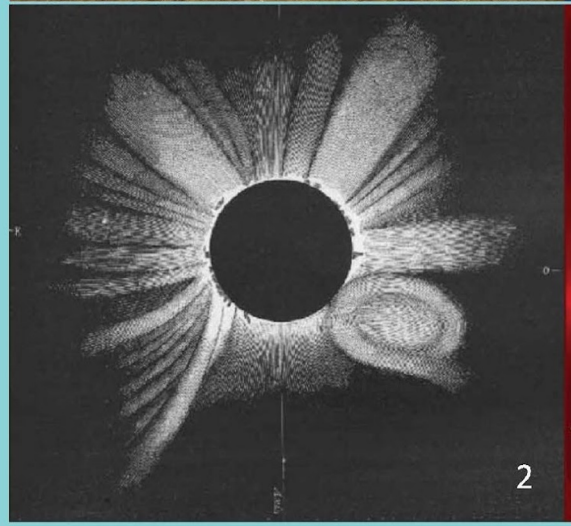
Figure 2. A 2D paper cut US map for the Saturday, October 14, 2023, annular solar eclipse. Not to scale. See Learner Handout. Credit: NASA HEAT/J. Patrick Haas

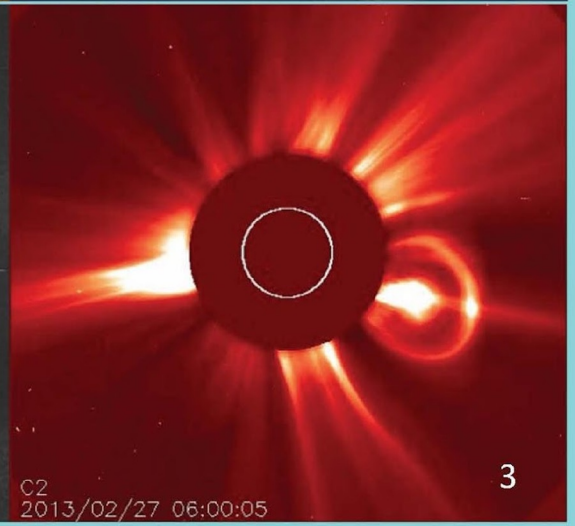
https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2023



A 3D printed US map for the Monday, April 8, 2024 total solar eclipse. Not to scale. Credit: NASA HEAT/J. Patrick Haas

https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2024





Counterclockwise:

1. Rock art from A.D. 1097 showing a possible solar eclipse in Chaco Canyon, NM.

2. Drawing of the 1860 eclipse by G. Tempel showed a peculiar feature in lower right portion of the corona.

3. A coronal mass ejection (CME) observed by the SOHO satellite. Credit: NASA & ESA

4. A total solar eclipse gives scientists a rare opportunity to study the Sun's inner corona. These observations can help us understand solar activity and the unexpectedly high temperatures in the corona. Credit: S. Habbal, M. Druckmüller and P. Aniol

Heliophysics “Big Year”

ECLIPSE
THROUGH THE EYES OF NASA

2024 Total Solar eclipse
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NASA

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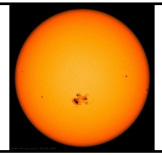
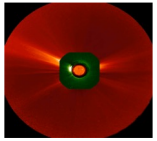
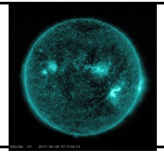
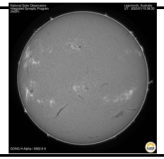
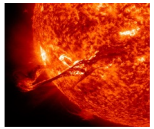
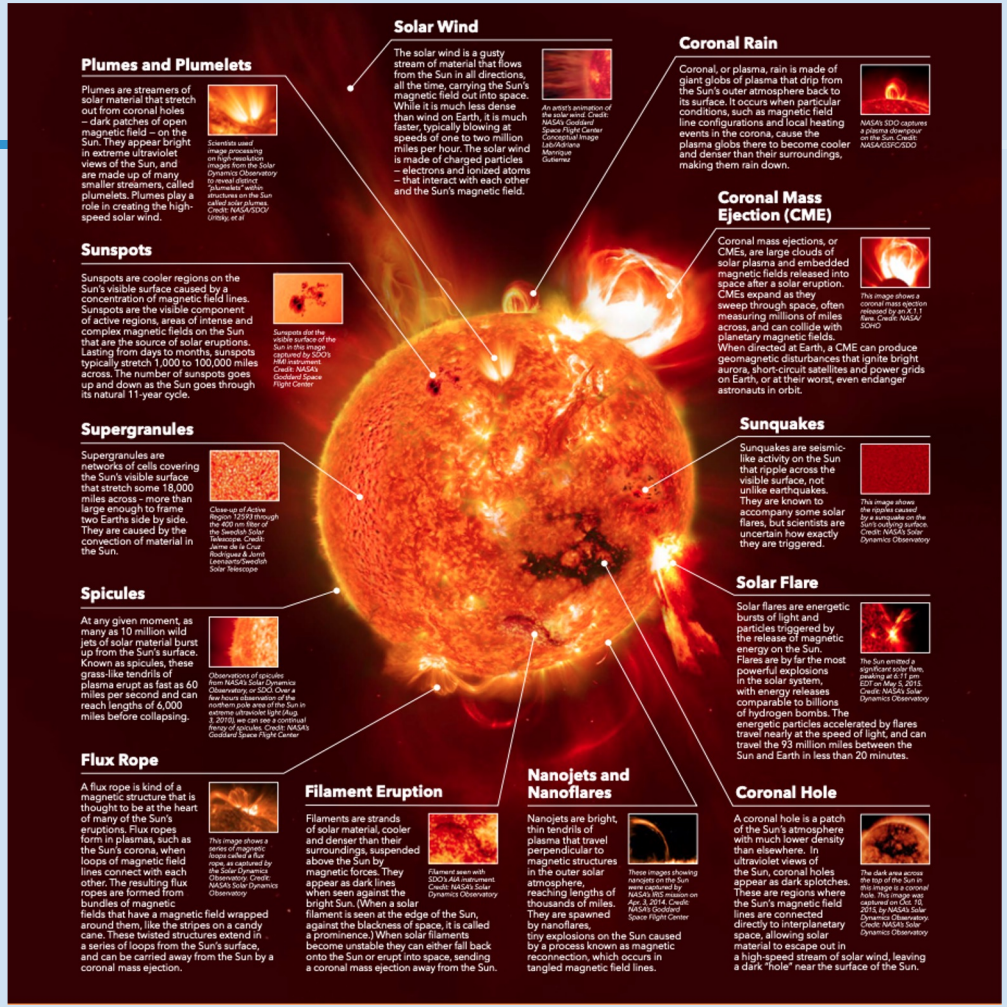
Solar Features

	Sunspot	A dark area on the solar surface that contains strong magnetic fields, moves along with the Sun's rotation, and lasts for days.
	Coronal Mass Ejection	A cloud of magnetized solar material that erupts from the Sun's atmosphere, the corona, into interplanetary space.
	Flare	An intense burst of light and radiation due to the release of magnetic energy on the Sun.
	Filament	A cloud of plasma (charged particles) above the solar surface, like an eyebrow or a snake. It is a prominence on the Sun’s limb.
	Plage (French for beach)	A bright patch surrounding active regions known as sunspots.
	Prominence	A huge arc of plasma over the Sun's limb or horizon that is supported in the Sun's atmosphere by magnetic fields.



2024 Total Solar eclipse THROUGH THE EYES OF NASA

NASA

[The NASA Heliopedia]

Observing our star, the Sun, can be safe and inspirational

Find more: solarsystem.nasa.gov/eclipses

Explain

- What is a solar eclipse?
- Why do they happen?
- What are the different kinds of eclipses?
- What can be learned from an annular solar eclipse?
- What can be learned from a total solar eclipse?
- What features may be visible on the Sun?

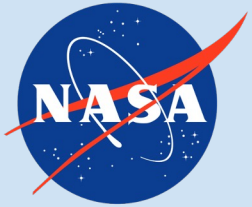
- Experiencing an eclipse is one way that everyone can participate in NASA Science.
- Exploring our Sun and its interactions with Earth is possible through innovative NASA missions.

HELIOPHYSICS BIG YEAR

Learn more about the Heliophysics Big Year: October 2023 to December 2024

Find more: solarsystem.nasa.gov/eclipses

Thank You!



Find more about eclipses: solarsystem.nasa.gov/eclipses

This presentation is supported by the NASA Heliophysics Activation Team (NASA HEAT), part of NASA's Science Activation portfolio.

Resources

Annular, Total, and Partial Eclipses
https://solarsystem.nasa.gov/resources/2770/annular-eclipse-of-october-3-2005/?category=eclipse
https://solarsystem.nasa.gov/resources/2757/total-solar-eclipse-above-madras-oregon/?category=eclipse
https://solarsystem.nasa.gov/resources/2628/a-partial-solar-eclipse/

The 2023 and 2024 Solar Eclipses: NASA Map and Data
https://svs.gsfc.nasa.gov/5073

Annular Eclipse
https://solarsystem.nasa.gov/resources/2770/annular-eclipse-of-october-3-2005/?category=eclipse
https://www.nasa.gov/mission_pages/hinode/hinode-sees-annular-solar-eclipse-from-orbit.html

Pinhole Projectors
https://www.youtube.com/watch?v=vWMf5rYDgpc
https://svs.gsfc.nasa.gov/vis/a010000/a012200/a012200/Colander4_JoyNg.jpg
https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2023
https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2024

Total Solar Eclipses - the Corona
https://solarsystem.nasa.gov/resources/2757/total-solar-eclipse-above-madras-oregon/?category=eclipse
Predict the Corona Activity - coming soon

Coronal Mass Ejection during a Total Solar Eclipse
https://student.helioviewer.org/
https://mpt.pbslearningmedia.org/resource/buac17-912-sci-ess-nveoacme/wgbh-nova-eclipse-over-america-coronal-mass-ejections-from-the-sun/

Heliophysics Big Year
go.nasa.gov/HelioBigYear

Resources

Sunspot - white light, also SDO HMI
SDO Sunspot 2014 latest_1024_hmiic_0.jpeg
https://www.nasa.gov/content/goddard/sdo-observes-largest-sunspot-of-the-solar-cycle/

Coronal Mass Ejection - SOHO LASCO and STEREO A
https://www.nasa.gov/sites/default/files/thumbnails/image/7-23-2017-cme.gif
http://soi.stanford.edu/results/SolPhys200/Dere/index.html

Flare - extreme ultraviolet (EUV), SDO AIA 131, 193
https://www.nasa.gov/sites/default/files/thumbnails/image/quick_double_x_flare-1041.gif
https://sdo.gsfc.nasa.gov/gallery/main/item/133

Filament - H-Alpha, SDO AIA
https://www.stce.be/news/597/welcome.html
https://www.nasa.gov/content/goddard/sdo-sees-giant-filament-on-the-sun

Plage - H-Alpha, Ca K
https://gong2.nso.edu/HA/hag/202301/20230115/20230115041732Uh.jpg

Prominence - H-Alpha, SDO AIA 304
https://sdo.gsfc.nasa.gov/assets/img/site/spaceweather01.jpg

NASA Heliopedia
https://www.nasa.gov/sites/default/files/thumbnails/image/features_of_the_sun_thumbnail_0.png
https://www.nasa.gov/mission_pages/sunearth/the-heliopedia