The Sun and the Eclipse Across America

August 21, 2017

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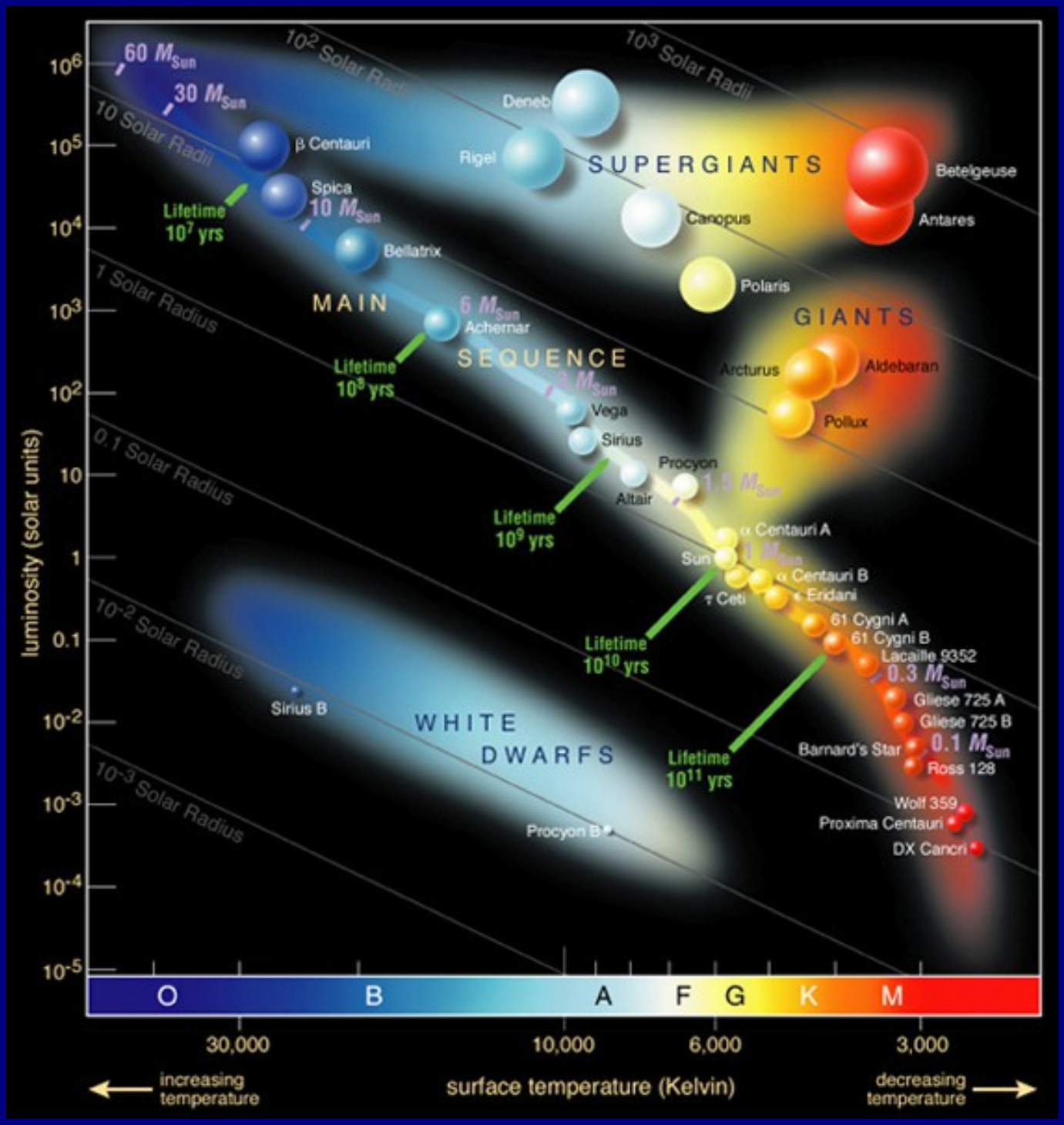
ST13, NASA/MSFC

Image Courtesy of Dr. Alphonse Sterling, NASA/MSFC

August 1, 2008 Gansu Province, China

What IS the Sun?



The Sun is a Star
Stars are Mostly Hydrogen Gas

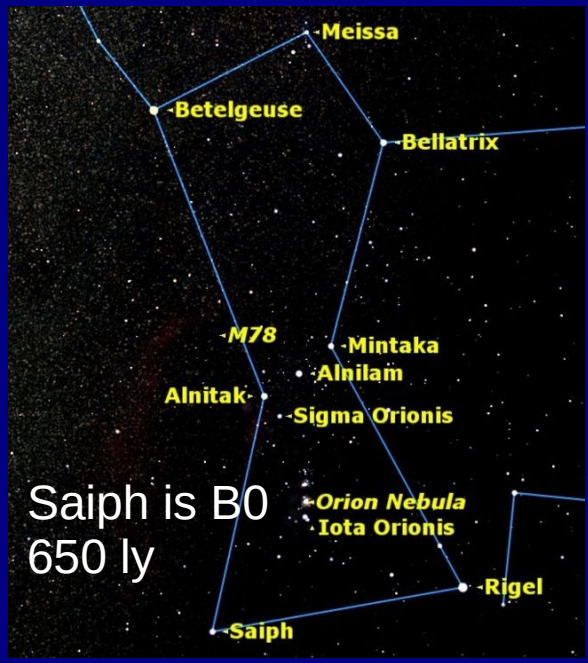
α-Cen-A is G2,
α-Cen-B is K1,
Proxima (α-Cen-C) is M6,

the Sun is G2
8.5 light minutes away

Betelgeuse is M2
643 ly

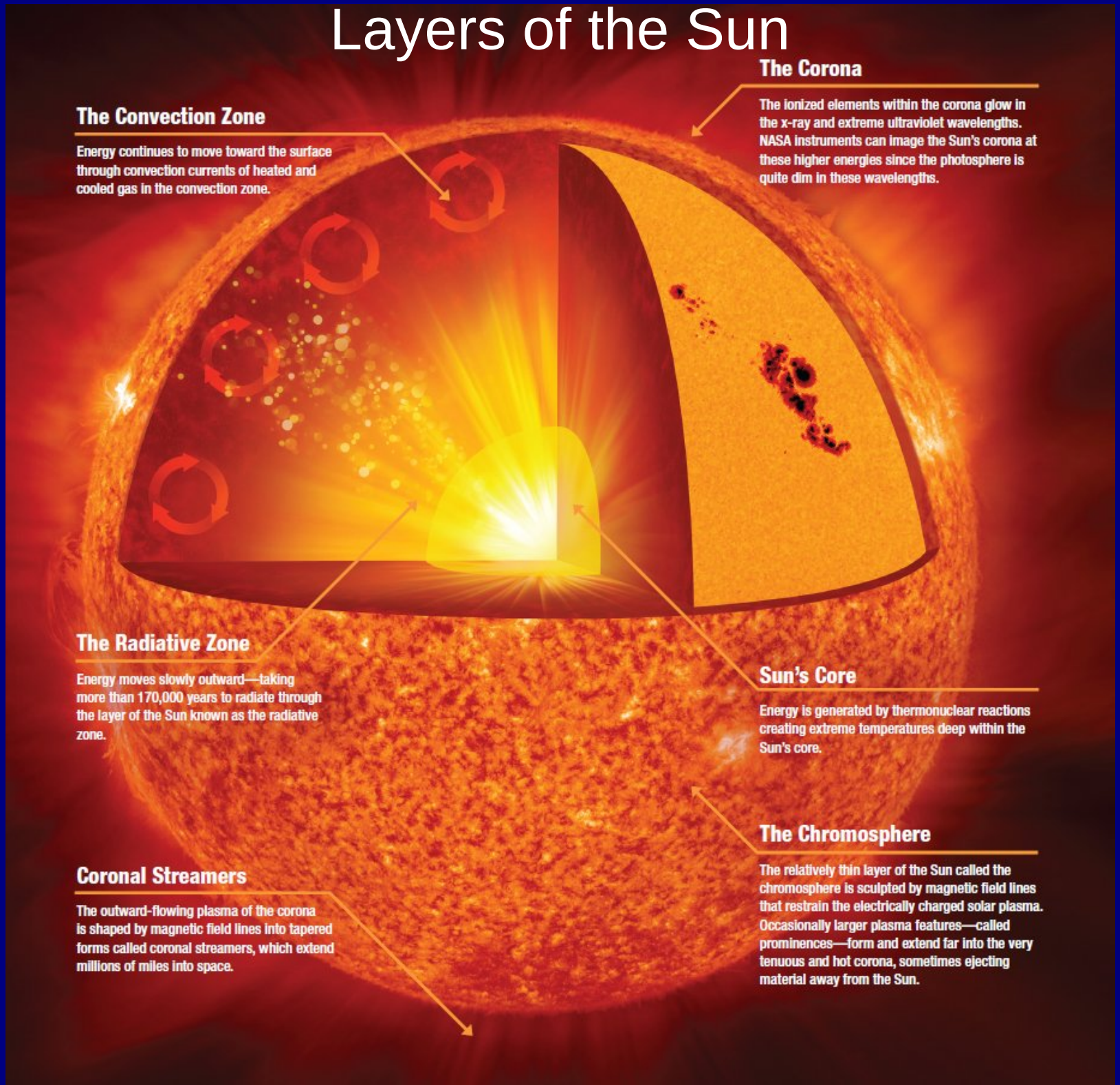
Bellatrix is B2
250 ly

Rigel is B8
860 ly

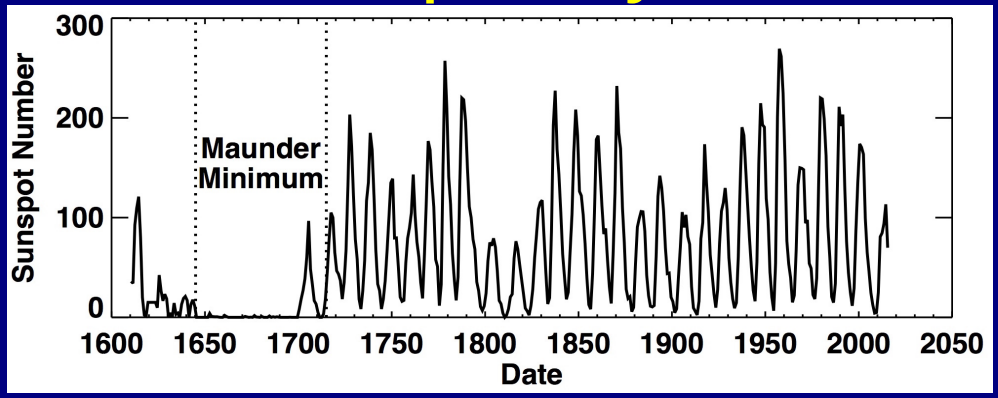


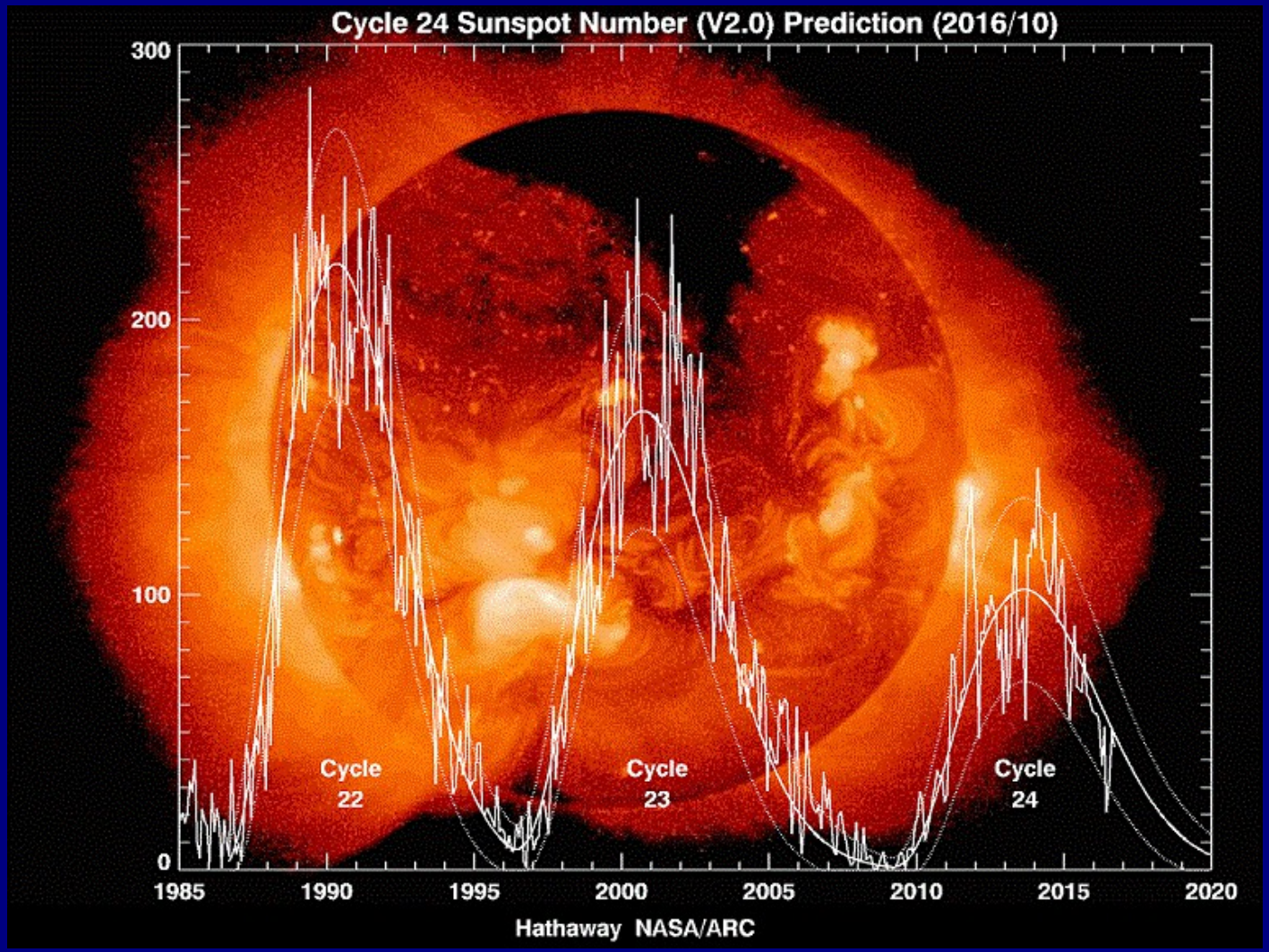
Saiph is B0
650 ly

Layers of the Sun



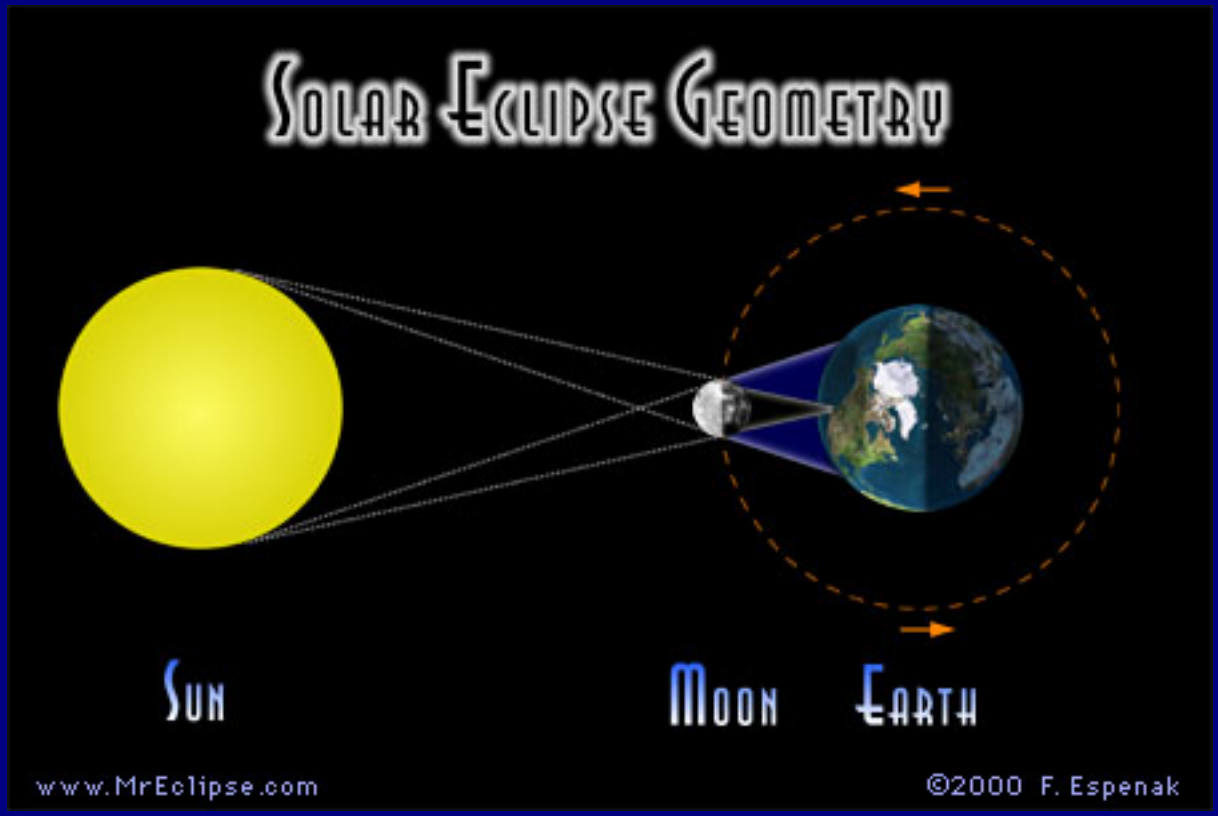
Sunspot Cycle





What is an Eclipse?

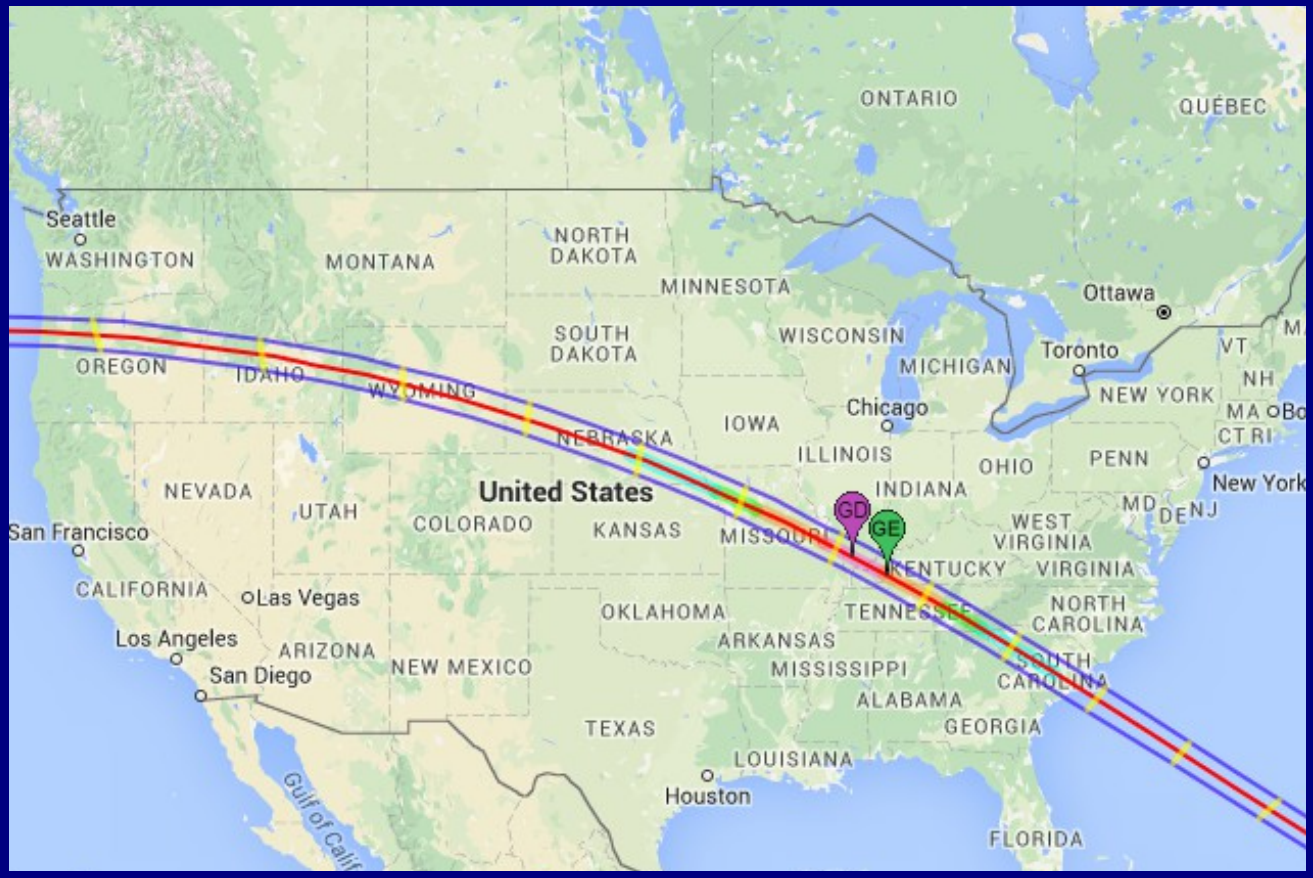
An eclipse happens when one object blocks the light of another



Images Used With Permission

Eclipse Across America

August 21, 2017



Close to Hopkinsville, Kentucky (GE):

Start of partial eclipse	16:56 UT	11:56 a.m. CDT
Start of totality	18:24 UT	1:24 p.m. CDT
Maximum eclipse	18:25 UT	1:25 p.m. CDT
End of totality	18:26 UT	1:26 p.m. CDT
End of partial eclipse	19:51 UT	2:51 p.m. CDT

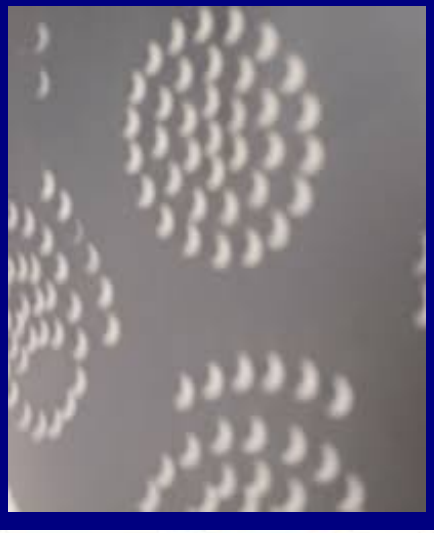
Eclipse Across America…in Tennessee

August 21, 2017

What You Can See: Partial Eclipse

The entire United States will see a partial eclipse.

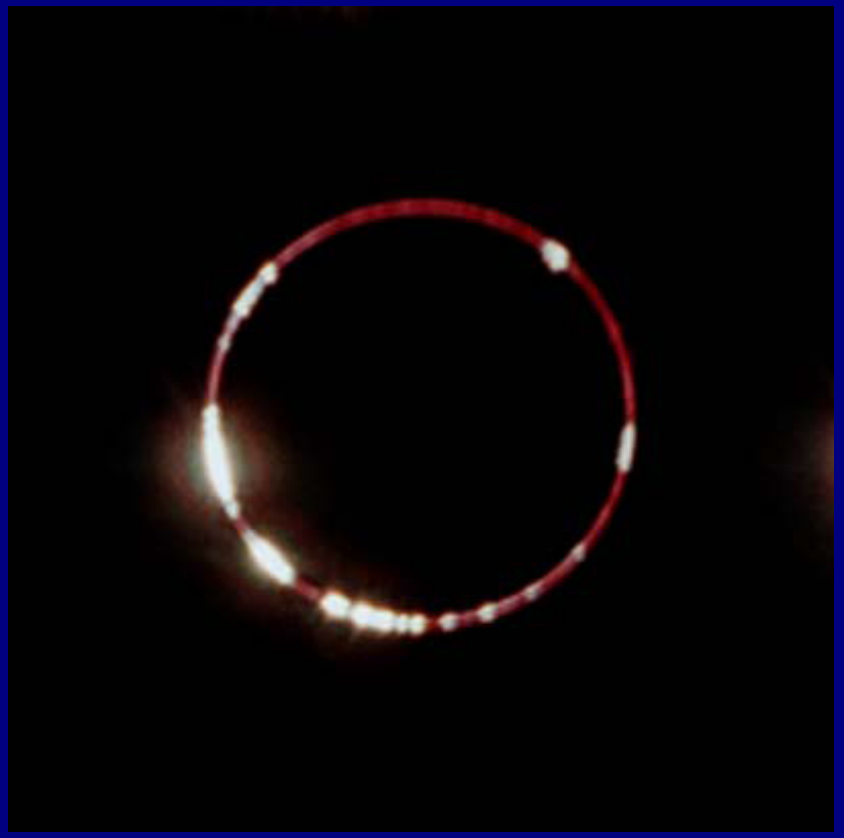
Use a Kitchen Colander or Trees For Partial Phases



Shadow Bands

Light shines through air, creating a wavy pattern similar to light through water in a pool

Total Eclipse: Diamond Ring and Bailey's Beads



What You Can See: Total Eclipse

Image Used With Permission

Zophia Edwards wide-angle view, from Jay Pasachoff's Eclipse 2013 page

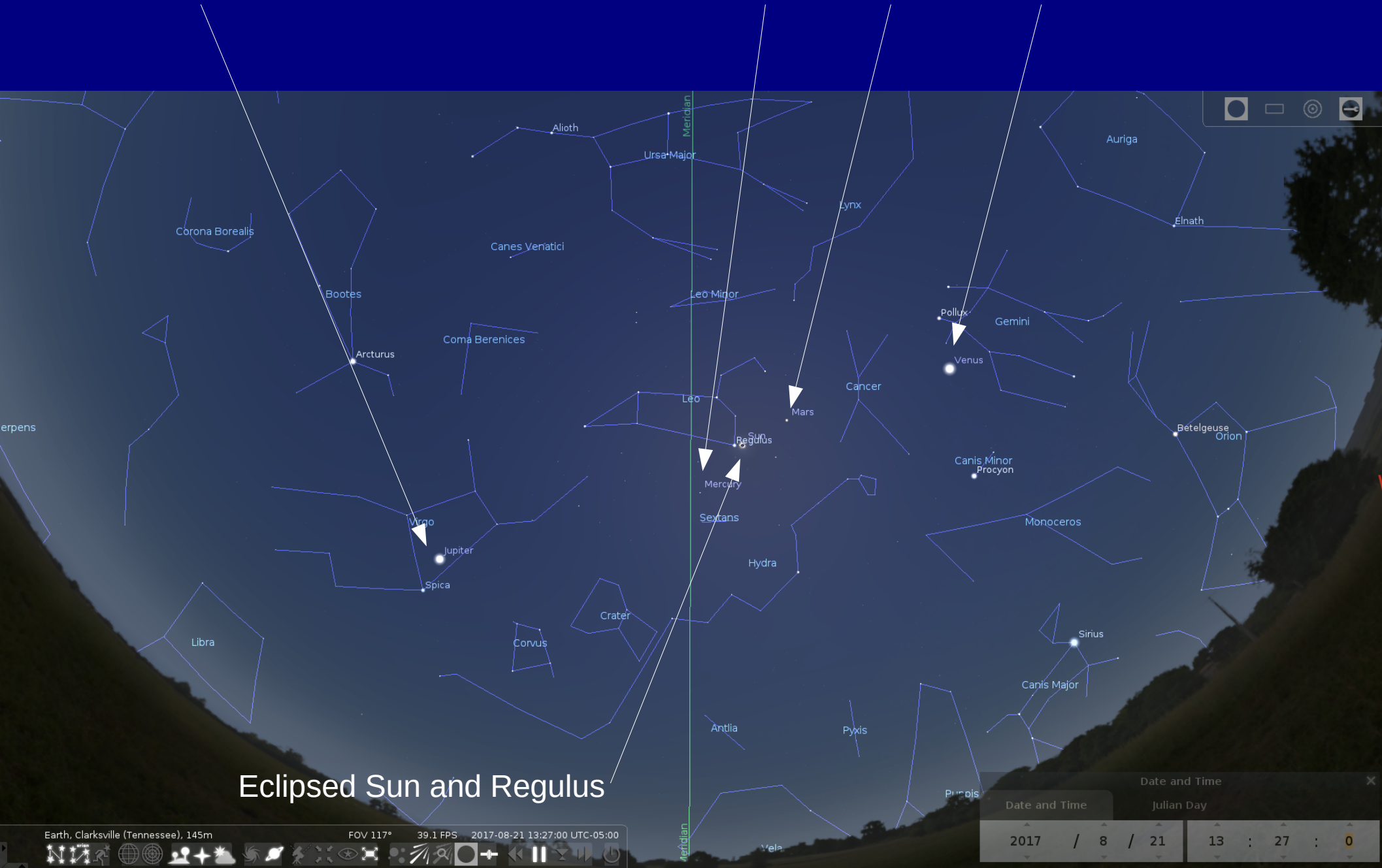
The Corona and Prominences

Rob Lucas, with Jay Pasachoff's 2013 Eclipse Expedition

Image Used With Permission

The Sky During Totality

Jupiter is to the east of the Meridian (left), Mercury, Mars, and Venus to the west.



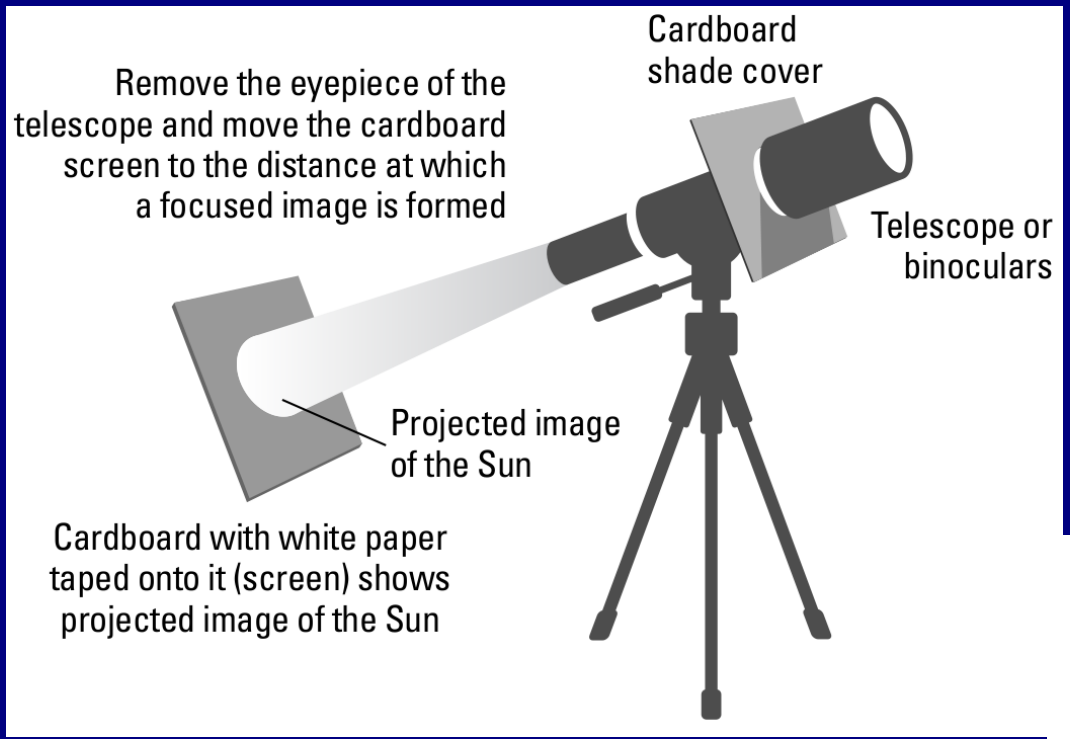
Safely Viewing an Eclipse

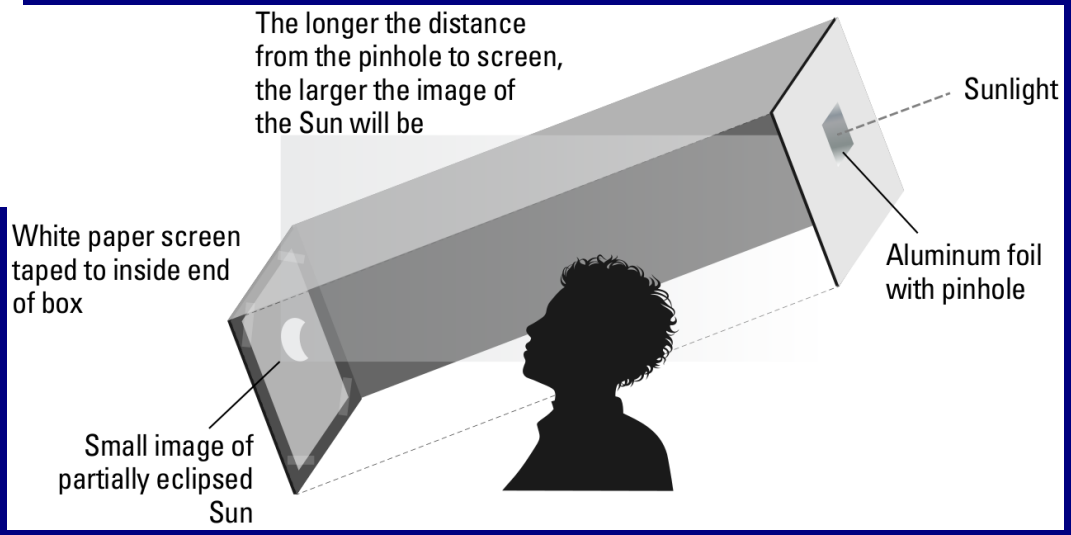
How to Safely Observe An Eclipse

No Special Rules for Lunar Eclipses

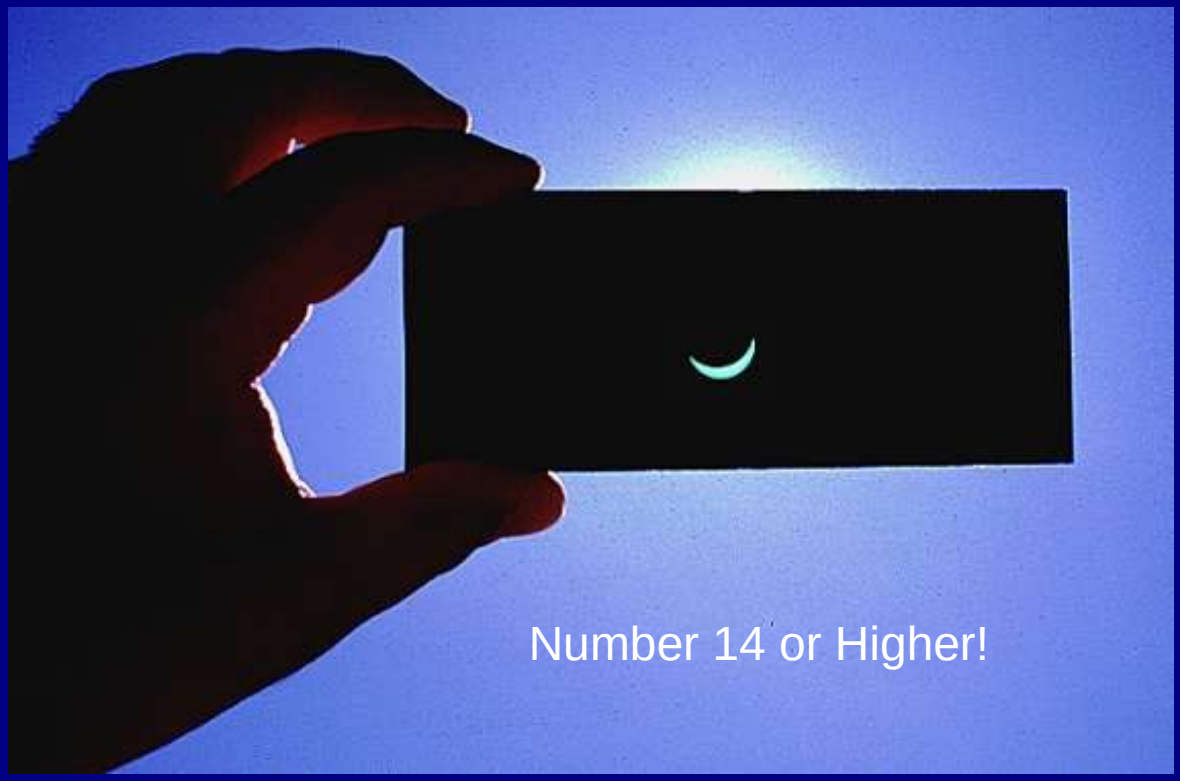
For Solar Eclipses:

- Projection
- Special Telescope Filters
- Eclipse Glasses
- Number 14 Welder's Glass





Eclipse Glasses and Welder's Glass



Solar Filters for Telescopes

More Information

http://www.astrosociety.org/tov/Build_a_Sun_Funnel2.pdf

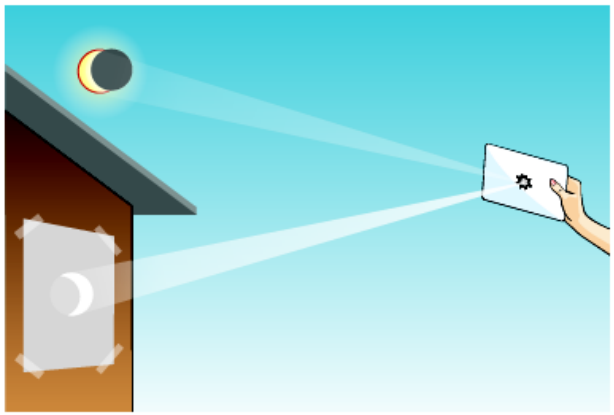
http://www.nasa.gov/offices/education/about/index.html

http://www.greatamericaneclipse.com/

http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2017Aug21Tgoogle.html

Safely Observing the Sun

WARNING: Never look directly at the Sun without proper eye protection. You can *seriously* injure your eyes.



Mirror in an Envelope

Slide a mirror into an envelope with a ragged hole cut into the front. Point the mirror toward the Sun so that an image is reflected onto a screen at least 5 meters (about 15 feet) away. The longer the distance, the larger the image.

Do not look at the mirror, only at the screen.

Local Area Eclipse Details

Location	% Covered	Start (CDT)	Max (CDT)	End (CDT)
Nashville, TN	100.0%	11:58AM	1:28PM	2:54PM
Totality begins 1:27PM • Totality ends 1:29PM				
Brentwood, TN	100.0%	11:58AM	1:28PM	2:54PM
Totality begins 1:28PM • Totality ends 1:29PM				
Franklin, TN	99.9	11:58AM	1:28PM	2:54PM
Fayetteville, TN	98.2	11:59	1:30	2:56
Ardmore, AL/TN	97.3	11:59	1:29	2:55
Florence, AL	95.9	11:57	1:28	2:54
Athens, AL	96.7	11:59	1:29	2:56
Decatur, AL	96.1	11:59	1:30	2:56
Hartselle, AL	95.8	11:59	1:30	2:56
Madison, AL	96.7	11:59	1:30	2:56
USSRC	96.8	11:59	1:30	2:56
Huntsville, AL	97.0	11:59	1:30	2:56
VBAS	97.1	12:00NOON	1:30	2:56
Arab, AL	96.0	12:00	1:31	2:57
Gurley, AL	97.1	12:00	1:31	2:57
Guntersville, AL	96.4	12:01	1:31	2:57
Scottsboro, AL	97.4	12:01	1:31	2:57
Bridgeport, AL	98.6	12:01	1:32	2:57

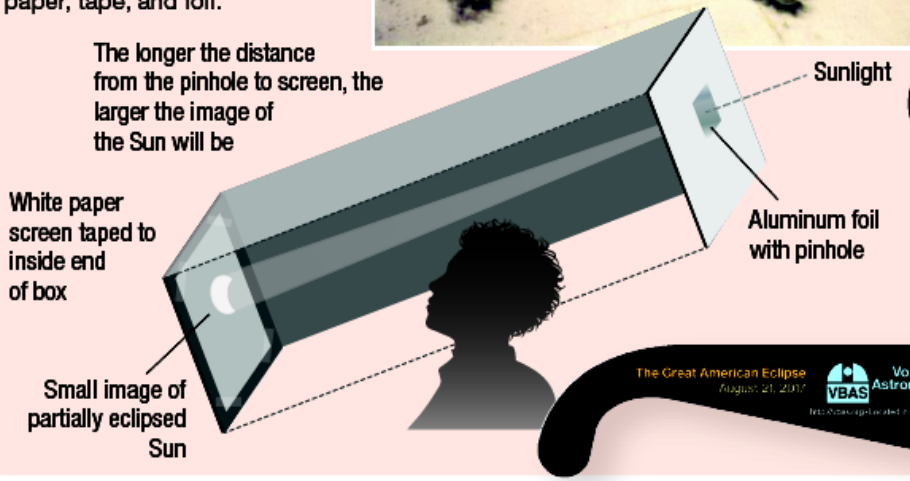
JAVA Script Solar Eclipse Explorer
http://eclipse.gsfc.nasa.gov/JSEX/JSEX-NA.html

Strange Shadows!

Sunlight through trees produces projected crescents during partial phases.

Go Stick Your Head in a Box

You can make this simple "eclipse telescope" with some cardboard, paper, tape, and foil.



Sun Funnel

Make this device for your telescope with simple instructions at: www.astrosociety.org/tov/Build_a_Sun_Funnel.pdf

Cool in the Shades

Visit the Von Braun Astronomical Society (or your local astronomical society) and pick up a pair of these special Eclipse Sunglasses!

www.vbas.org

Safely observing an eclipse

National Aeronautics and Space Administration

Never look at the Sun directly without proper eye protection, **except** during **totality** of a solar eclipse.

During the partial phases of a solar eclipse you must use special solar filters, eclipse glasses, #14 welder's glass, or handheld solar viewers. Never use homemade or un-tested materials for direct solar viewing.

Check eclipse glasses for ISO number 12312-2 or European Union certification (CE), which certifies that the product meets international standards.

Partial Eclipse Glasses on

The eclipse begins when the sun's disk is partially blocked by the moon. This partial eclipse phase can last over an hour.

Diamond Ring Glasses on

The last of the sunlight streaming through the Moon's valleys creates a single bright flash of light on the side of the Moon. This is known as the diamond-ring effect, and it marks the last few seconds before totality begins.

Baily's Beads Glasses on

As totality approaches, only the low-lying valleys on the Moon's edge allow sunlight through, forming bright spots of light called Baily's Beads.

Totality Glasses off

Once the diamond ring disappears and the moon completely covers the entire disk of the sun, you may safely look at the eclipse without a solar filter. Be careful to protect your eyes again before the end of totality—the total eclipse may last less than a minute in some locations.

Final Stages Glasses on

A crescent will begin to grow on the opposite side of the sun from where the Baily's Beads shone at the beginning. This crescent is the sun beginning to peek out from behind the Moon and its your signal to stop looking directly at the eclipse. Make sure you have safety glasses back on!

Safely observing the Sun!

Warning! Never look directly at the sun without proper eye protection. You can seriously injure your eyes. Check with local science museums, schools and astronomy clubs for eclipse glasses—or purchase an ISO 12312-2 compliant and CE certified pair of these special shades!

www.nasa.gov