



GLOBE AT NIGHT

Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?

www.globeatnight.org/eclipse-2017/

August 21, 2017

“On August 21, 2017, millions of people across the United States will see nature's most wondrous spectacle — a total eclipse of the Sun. It is a scene of unimaginable beauty; the Moon completely blocks the Sun, daytime becomes a deep twilight, and the Sun's corona shimmers in the darkened sky.” For more information on the total solar eclipse (e.g., locations for the eclipse path and the local times for totality), visit www.greatamericaneclipse.com.

If you are on or near the centerline of the path of totality during the solar eclipse on August 21, 2017, you are able to participate in an activity to observe and record the faintest stars visible as a means of measuring how dark the daytime sky gets. By noticing which stars are visible during the solar eclipse, comparing them to stars on stellar or “magnitude” charts, and submitting that measurement to the online database, your “measurement” will document darkness levels of a daytime sky during a total solar eclipse, a simple question scientists are still asking. Your measurement will also help scientific research on the effects on wildlife, among others.

To help research more, you can also take regular Globe at Night measurements of the night sky brightness on August 20 and August 21 for comparison with the eclipse measurements. To take the nighttime Globe at Night measurements, go to www.globeatnight.org/webapp/. The steps are similar to the ones described here under “Easy Steps to Do This Activity”.

Materials Needed to Do This Activity:

All you need is a smart mobile device and internet access to www.globeatnight.org/eclipse-2017/webapp/ for the report page,

OR you can use the paper version of the report page in this guide & submit your observation(s) to the URL address later.

Remember: Safety First!

- When any part of the Sun is visible, do not look at the Sun without approved solar filters such as eclipse glasses from a reputable source that are used properly. Failure to heed this rule may result in permanent eye damage.
- If you are on the path of totality, during the two and a half minutes of the **total** solar eclipse, it is safe to look directly at the Sun's corona with your eyes. However, when totality ends and the sky suddenly brightens, immediately turn your eyes away & put your solar filters or eclipse glasses back on.

Before the eclipse starts:

Review the page of charts nearest your location. The five pages of charts each represent a different location across the path of totality: Salem, Oregon; Cory, Wyoming; Craig, Missouri; Wildwood Hills, Kentucky; and Goose Creek South Carolina. (See the map of the locations on the next page.) The pages of charts show you the whole sky at the local time when the eclipse is at the maximum in each of the 5 locations. On each page, there are four charts, labeled “Magnitude 0 Chart” through “Magnitude 3 Chart”. If your sky is darker, you will see more stars and those additional stars will be fainter. Plus the chart number will be higher (e.g., “Magnitude 3 Chart” versus “Magnitude 0 Chart”). By choosing the chart with the faintest stars you can see, you are measuring the darkness of the daytime sky during a total solar eclipse. [Note: To help in locating the bright stars and planets, the cardinal directions (N, S, E, W) are printed on each chart.]

Suggested tips to get the most reliable measurements:

- Try to make measurements after the total eclipse phase starts (called “C2”) and before it ends (called “C3”). During the total eclipse phase, the rhodopsin secretion in our eyes will begin and as totality progresses, our eyes will become better adapted to take measurements.
- Wear a well-sealed eye-patch on one eye starting a least a half an hour before totality. This will trigger the dark adaptation process in that eye. You can remove the patch right after C2 (after the diamond ring). This will result in a significant increase in the eye's dynamic response range, improving the eye's sensitivity to contrast and detail.

Easy Steps to Do This Activity (between C2 and C3):

1) Record local time. Using the online report page, the time will be automatically inputted if you are using a smart device. Otherwise record HH:MM:SS local military time on the online report page or the paper version (page 3) of the report page. Noting seconds is very important, since the eclipse is not long (only 2 ½ minutes at best on the solar eclipse path centerline).

2) Record your location (latitude and longitude) using the interactive tool on the online report page at www.globeatnight.org/eclipse-2017/webapp/. With a smart cell phone or tablet, the latitude and longitude are automatically determined as you report the observation. If you are reporting it later from your computer, input the address of the observation or input your city. Zoom in/out and pan around until you find the observation location. The latitude and longitude will be displayed.

Charts in this document were prepared by Jenik Hollan, CzechGlobe, - Global Change Research Institute of the Czech Academy of Sciences
amper.ped.muni.cz/jenik/astro/maps/GaNight/2017/2017-08-21SolEcl/350_24p/

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3) Find the faintest objects. No matter where you are along the solar eclipse path centerline, the planet Venus and the stars Sirius and Capella should be visible during totality with clear skies. (See the magnitude charts on the subsequent pages.) Besides the eclipse, they will be among the brightest objects in the sky. Venus will be only 34 degrees West of the Sun. From the time the eclipse reaches Wyoming and eastward, the planet Jupiter and the star Arcturus will be rising and Jupiter will be bright. After the eclipse reaches mid-country, Sirius will be low in the western horizon and not as easily detected (e.g., more atmosphere for light to go through). By the time the eclipse reaches South Carolina, Capella starts to set and will become more difficult to spot.

In addition to the brighter objects, the Magnitude 2 and Magnitude 3 Charts show fainter objects, such as the stars Procyon and Betelgeuse and the planet Mars. However, Mars, only 8° from the Sun, will most likely be difficult to spot. A good test to see how dark the night sky is, is to detect the Hyades and Pleiades clusters located west of Venus. Rigel is slightly brighter than Procyon and Betelgeuse but will have set by the time the eclipse reaches Kentucky. The clusters will be setting then as well.

4) Match your sky to one of our magnitude charts using the online report page at www.globeatnight.org/eclipse-2017/webapp/ or the paper version (pages 3-7). Select and report the chart that most closely resembles what you see.

5) Estimate the cloud cover. Select and report one of the 4 illustrations that most closely resembles what you see: clear sky, 25% of sky covered by clouds, 50% covered, or more than 50% covered.

6) Sky Quality Meter measurements are optional. See Unihedron.com for more information on these devices.

Compare your observation(s) to others along the eclipse path. Check back at www.globeatnight.org/eclipse-2017/ at a later date to view the map of measurements or become part of our Globe at Night Facebook page to be notified.

Latitude: 45°N, Longitude: 123°W (Salem, Oregon)

Duration of entire eclipse including partial phases: 2 hr, 32 min, 21 sec
Duration of totality: 1 minute, 47 seconds
Partial begins (C1): at 9:05:30 am PDT
Full begins (C2): at 10:17:27 am PDT
Maximum: at 10:18:22 am PDT
Full ends (C3): at 10:19:14 am PDT
Partial ends (C4): at 11:37:51 am PDT

Latitude: 43°N, Longitude: 110°W (Cora, Wyoming)

Duration of entire eclipse including partial phases: 2 hr, 44 min, 46 sec
Duration of totality: 35 seconds
Partial begins (C1): at 10:17:24 am MDT
Full begins (C2): at 11:37:00 am MDT
Maximum: at 11:37:19 am MDT
Full ends (C3): at 11:37:35 am MDT
Partial ends (C4): at 1:02:10 pm MDT

Latitude: 40°N, Longitude: 96°W (Craig, Missouri)

Duration of entire eclipse including partial phases: 2 hr, 53 min, 35 sec
Duration of totality: 2 minutes, 35 seconds
Partial begins (C1): at 11:38:30 am CDT
Full begins (C2): at 1:03:55 pm CDT
Maximum: at 1:05:12 pm CDT
Full ends (C3): at 1:06:30 pm CDT
Partial ends (C4): at 2:32:05 pm CDT

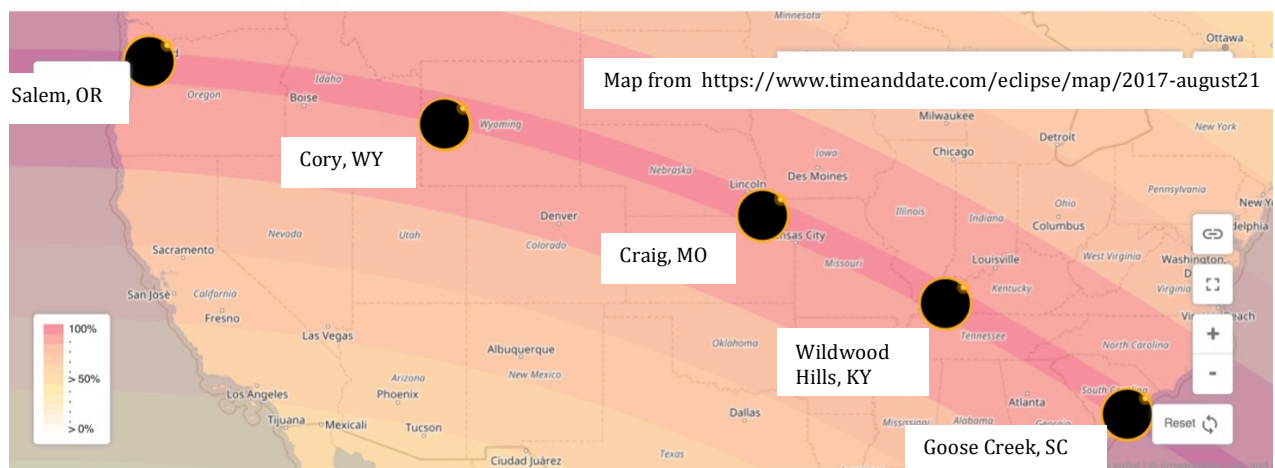
Latitude: 37°N, Longitude: 88°W (Wildwood Hills, Kentucky)

Duration of entire eclipse including partial phases: 2 hr, 55 min, 16 sec
Duration of totality: 2 minutes, 39 seconds
Partial begins (C1): at 11:55:22 am CDT
Full begins (C2): at 1:23:27 pm CDT
Maximum: at 1:24:46 pm CDT
Full ends (C3): at 1:26:06 pm CDT
Partial ends (C4): at 2:50:38 pm CDT

Latitude: 33°N, Longitude: 80°W (Goose Creek, South Carolina)

Duration of entire eclipse including partial phases: 2 hr, 52 min, 55 sec
Duration of totality: 2 minutes, 17 seconds
Partial begins (C1): at 1:16:34 pm EDT
Full begins (C2): at 2:45:31 pm EDT
Maximum: at 2:46:41 pm EDT
Full ends (C3): at 2:47:48 pm EDT
Partial ends (C4): at 4:09:29 pm EDT

Eclipse Map — August 21, 2017 Total Solar Eclipse





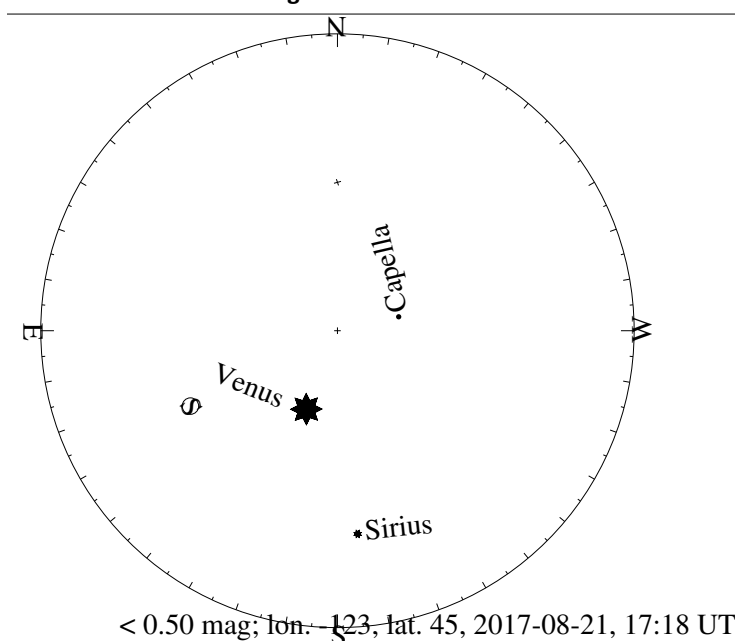
Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?

Magnitude Charts for locations up to 300 miles along the eclipse path from Salem, Oregon (45°N, 123°W)

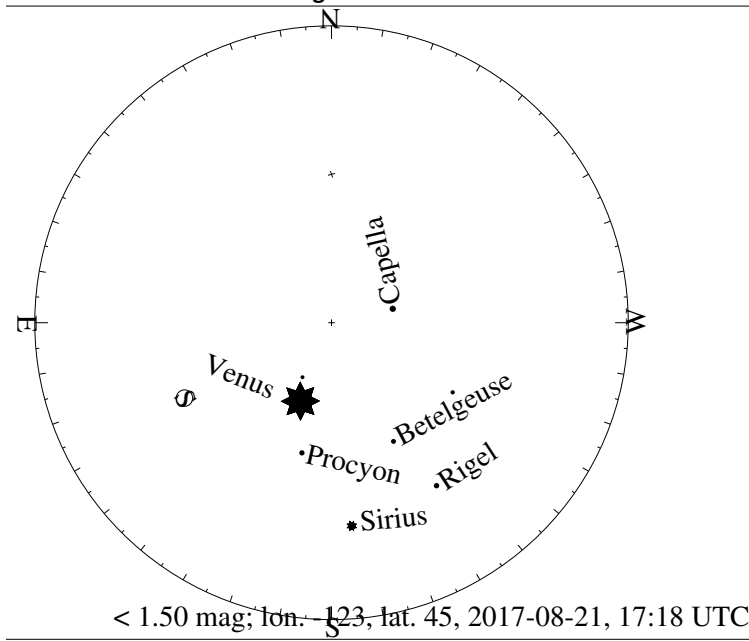
www.globeatnight.org/eclipse-2017/

August 21, 2017 (totality for Salem: 10:17:27am til 10:19:14am local time (PDT))

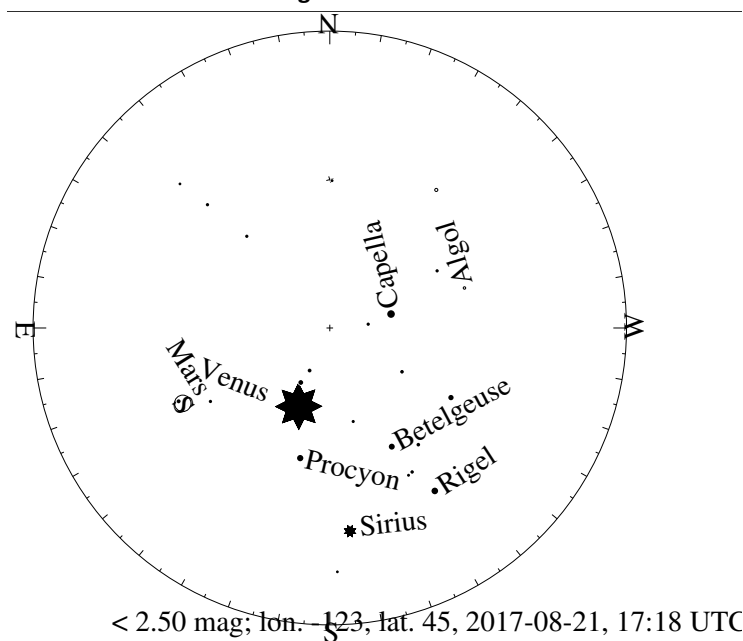
Magnitude 0 Chart:



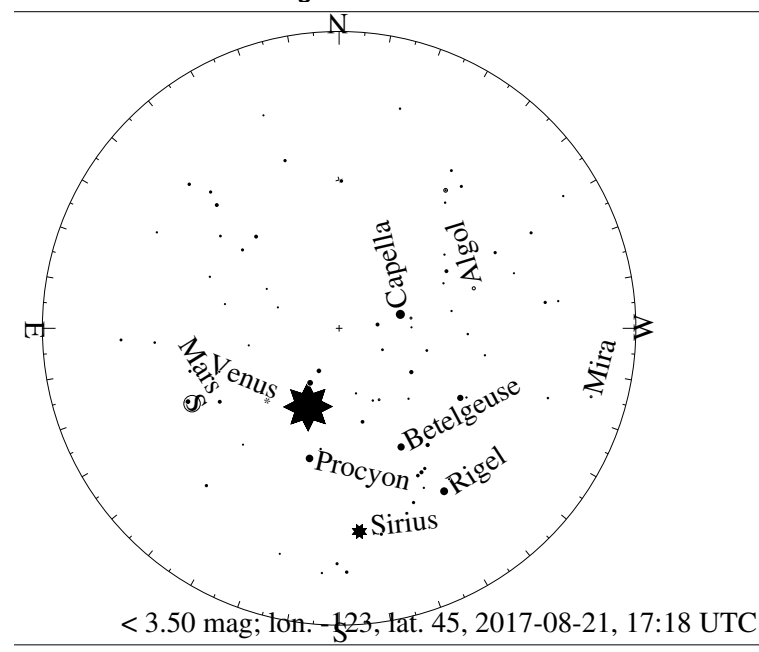
Magnitude 1 Chart:



Magnitude 2 Chart:



Magnitude 3 Chart:



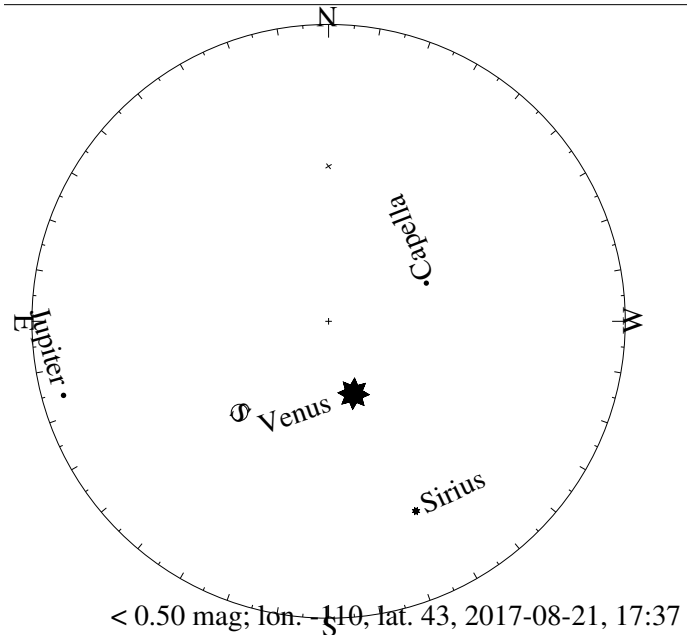


Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?
Magnitude Charts for locations up to 300 miles along the eclipse path from
Cora, Wyoming (43°N, 110°W)

www.globeatnight.org/eclipse-2017/

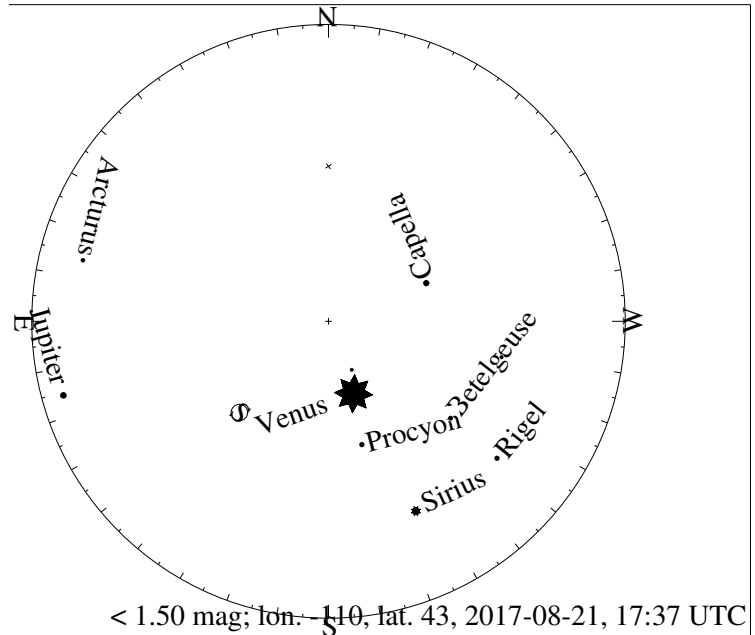
August 21, 2017 (totality for Cora: 11:37:00am til 11:37:35am local time (MDT))

Magnitude 0 Chart:



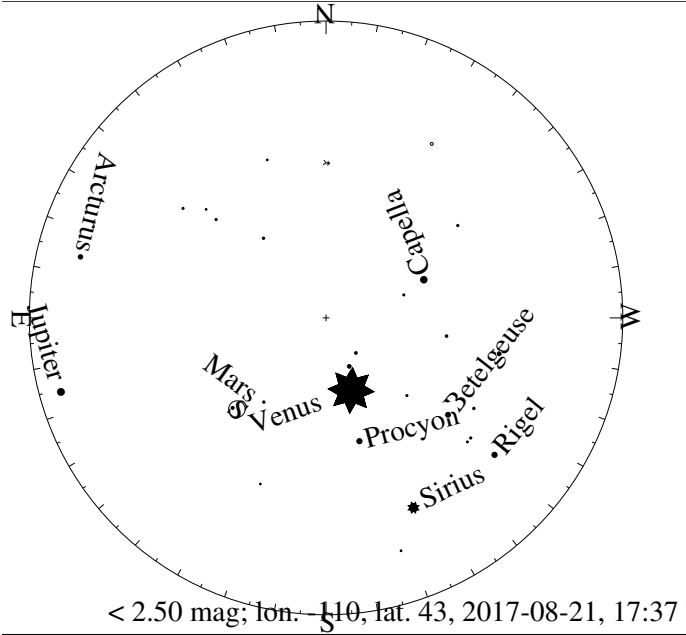
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Magnitude 1 Chart



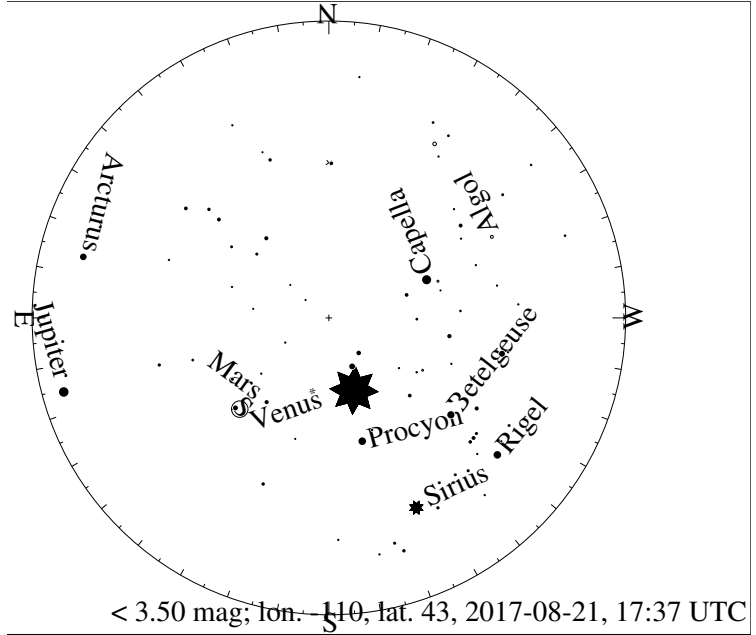
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Magnitude 2 Chart:



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Magnitude 3 Chart:



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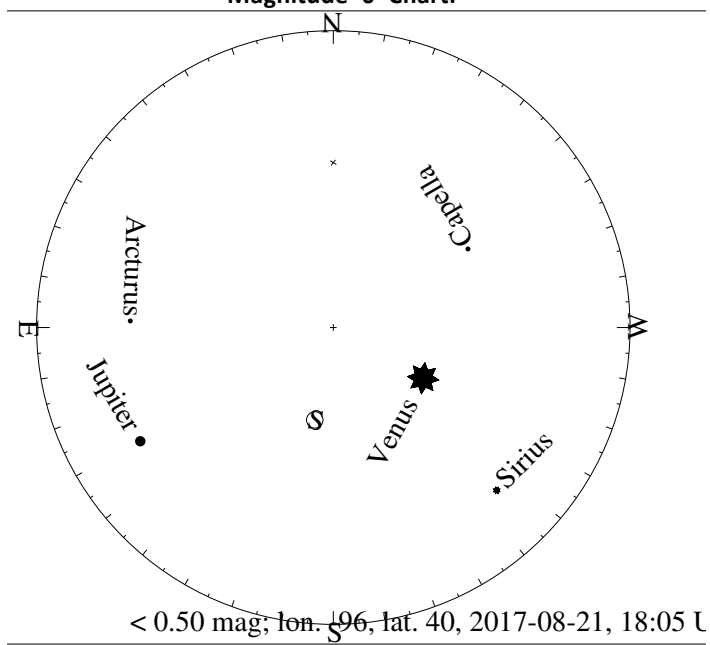
Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?

Magnitude Charts for locations up to 300 miles along the eclipse path from Craig, Missouri on (40°N, 96°W)

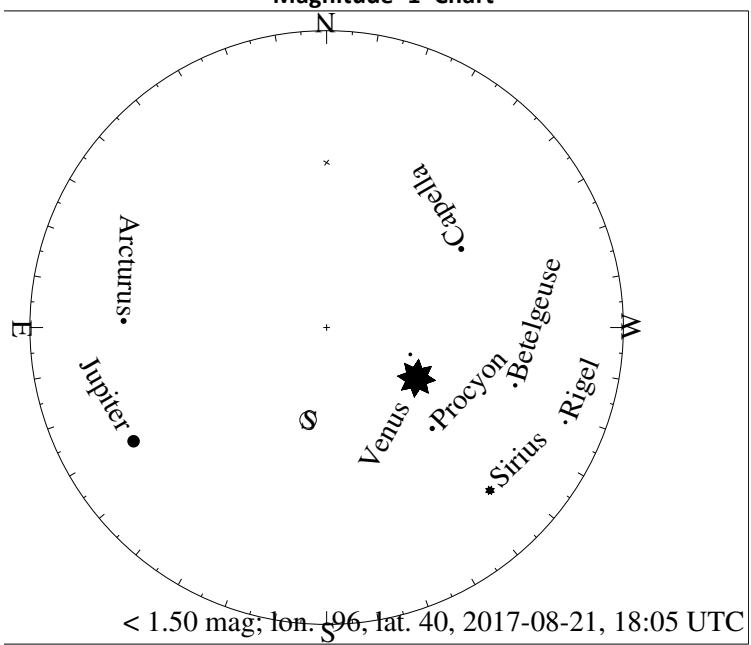
www.globeatnight.org/eclipse-2017/

August 21, 2017 (totality for Craig: 1:03:55pm til 1:06:30pm local time (CDT))

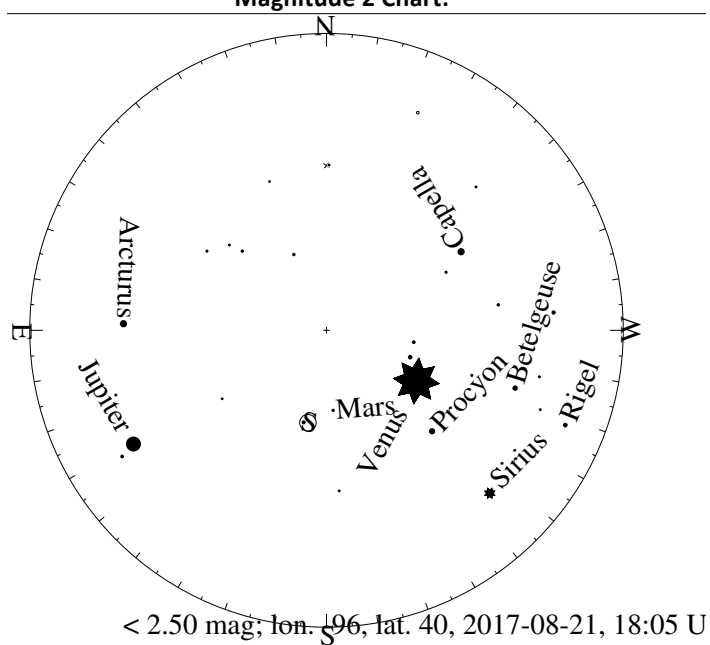
Magnitude 0 Chart:



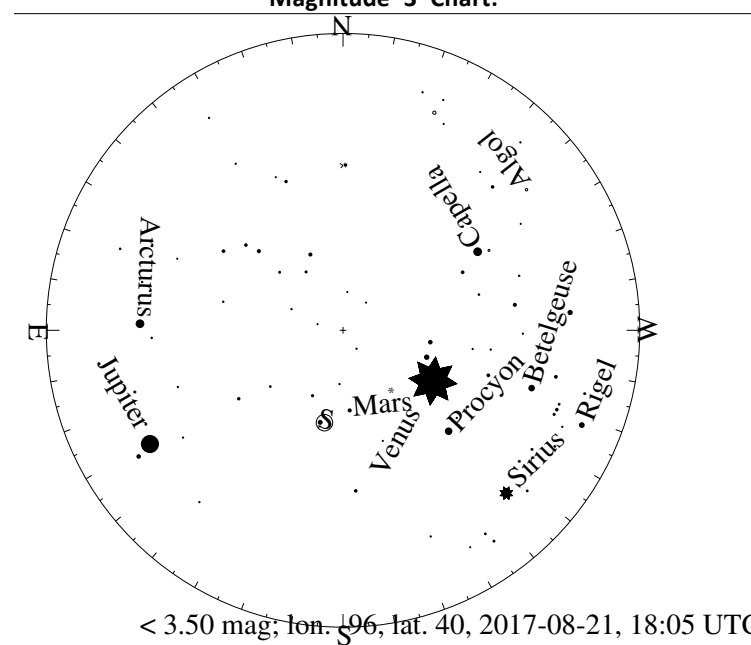
Magnitude 1 Chart



Magnitude 2 Chart:



Magnitude 3 Chart:





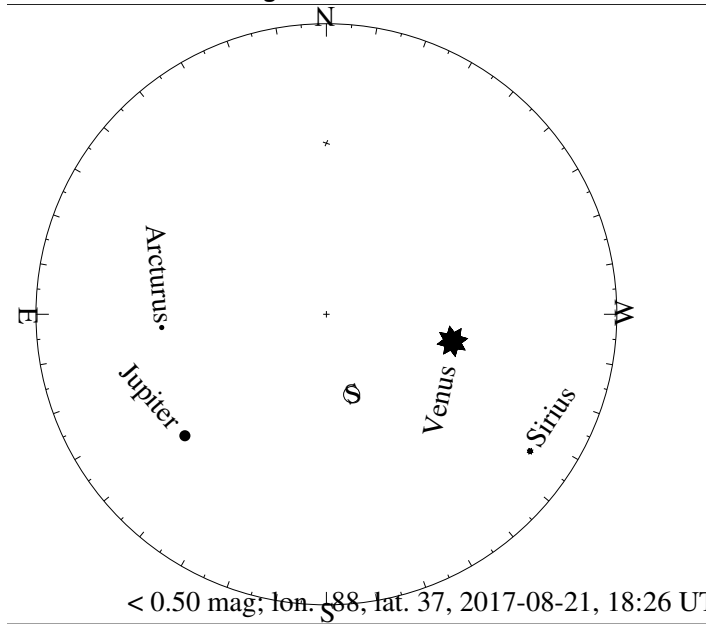
Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?

Magnitude Charts for locations up to 300 miles along the eclipse path from Wildwood Hills, Kentucky (37°N, 88°W)

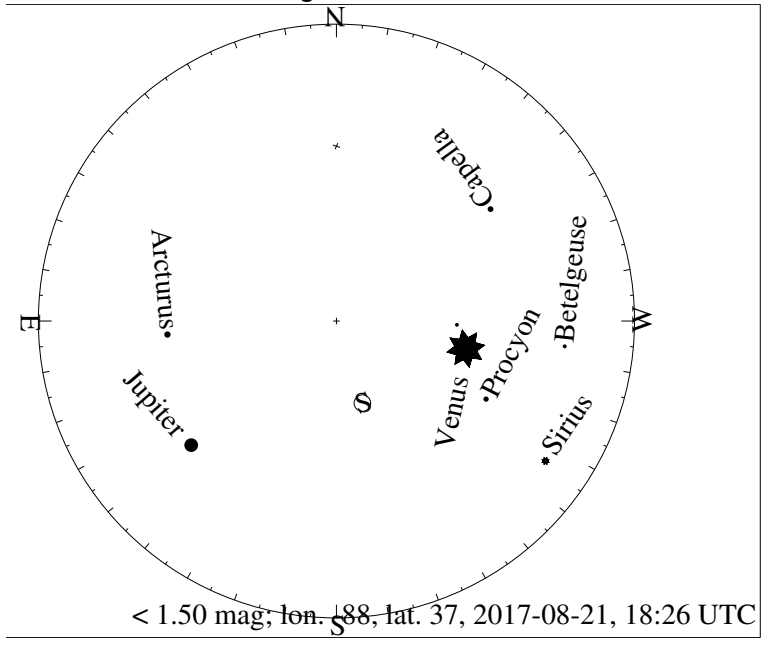
www.globeatnight.org/eclipse-2017/

August 21, 2017 (totality for Wildwood Hills: 1:23:27pm til 1:26:06pm local time (CDT))

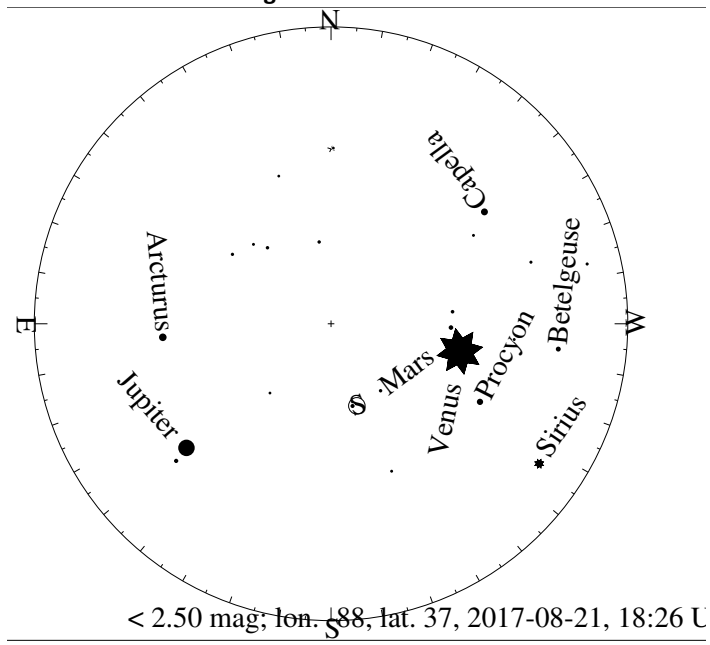
Magnitude 0 Chart:



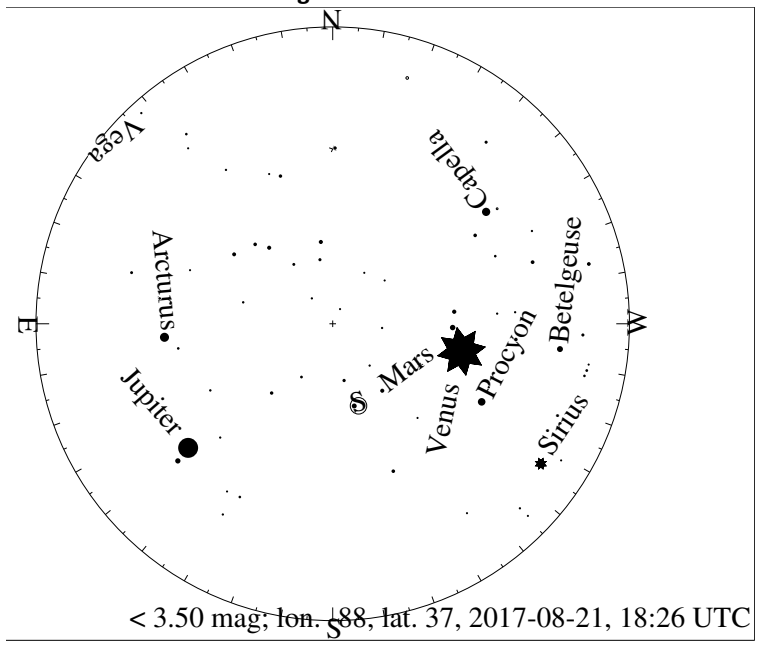
Magnitude 1 Chart



Magnitude 2 Chart:



Magnitude 3 Chart:





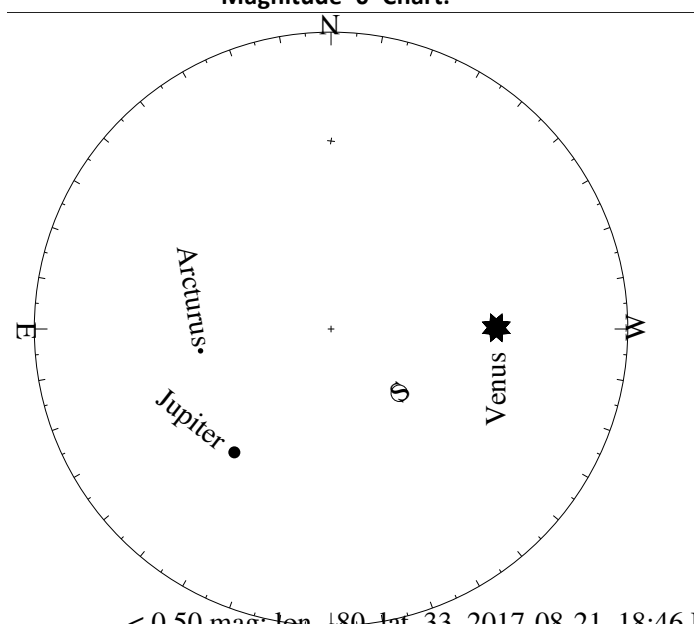
Activity Guide for How Dark Does the Sky Get During a Solar Eclipse?

Magnitude Charts for locations up to 300 miles along the eclipse path from Goose Creek, SC (33°N, 80°W)

www.globeatnight.org/eclipse-2017/

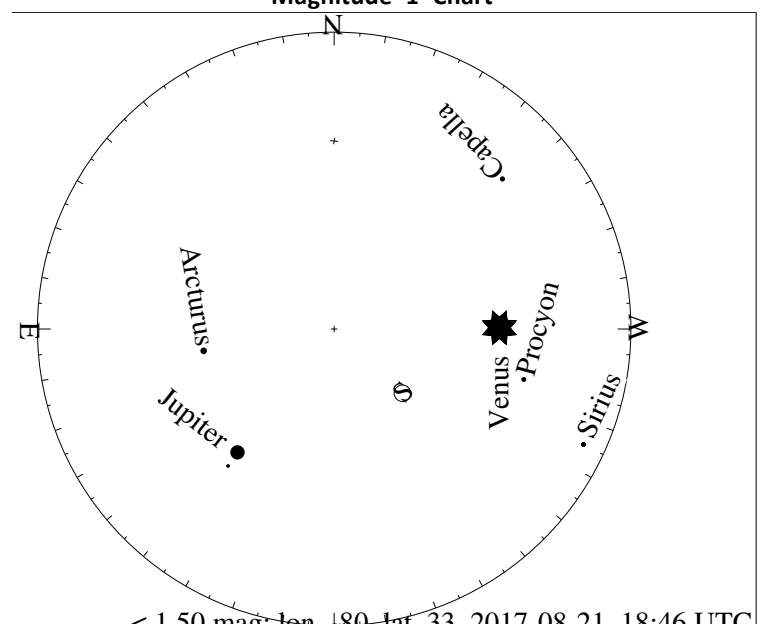
August 21, 2017 (totality for Goose Creek: 2:45:31pm til 2:47:48pm local time (EDT))

Magnitude 0 Chart:



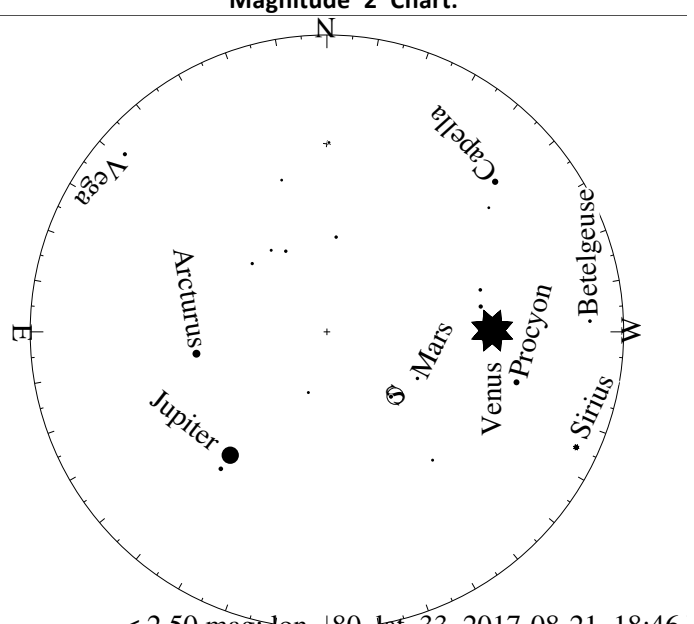
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Magnitude 1 Chart



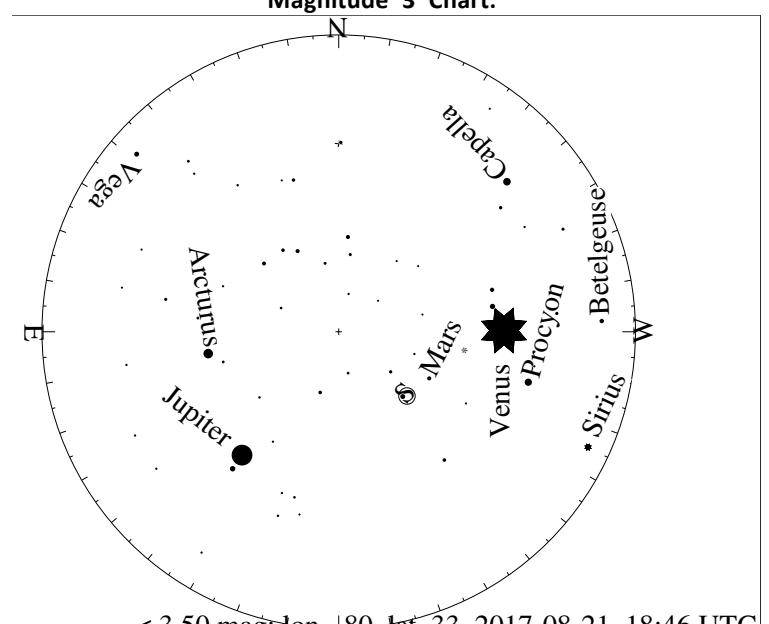
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Magnitude 2 Chart:



< 2.50 mag, lon. 80, lat. 33, 2017-08-21, 18:46

Magnitude 3 Chart:



< 3.50 mag, lon. 80, lat. 33, 2017-08-21, 18:46 UTC



Activity Guide for How Dark Does the Sky Get During a Solar Eclipse? Recording Page (use to report later at www.globeatnight.org/eclipse-2017/)

Only fields marked by * are required.

*Month: August *Day: 21 *Year: 2017

*Observation Time: : : local military time (HH:MM:SS) *State in USA:

*Latitude (in deg/min/sec deg min sec (North)
or decimal degrees): decimal degrees

*Longitude (in deg/min/sec deg min sec (West)
or decimal degrees): decimal degrees

OPTIONAL: Comments on location: (e.g. There is tree within 20m to the NE that is blocking my view.)

*Match your solar eclipsed daytime sky to one of our magnitude charts:

- Magnitude 0 Chart
 Magnitude 1 Chart
 Magnitude 2 Chart
 Magnitude 3 Chart

Reading from the Unihedron Sky Quality Meter (if applicable):

Serial number from the Unihedron Sky Quality Meter (optional):

*Estimate the cloud cover in the sky:

- Clear
 Clouds cover ¼ of sky
 Clouds cover ½ of sky
 Clouds cover > ½ of sky

OPTIONAL: Comments on sky conditions: (e.g. a little haze to the northeast)