

Observing the Great American Eclipse

Your name: _____

Class for which you are submitting this report: _____

This write-up is intended to guide an assigned observation of the Great American Eclipse on 8/21/2017, and your written report about your observation (or attempts to observe). It was created by [Professor John Mattox](#) on behalf of the FSU Astronomy Program, **DRAFT VERSION** - last modified by Mattox on 7/24/17. Students are expected to modify this word document for submission, changing the font color to red for their responses.

This assignment is intended for potential assignment by university (and high school) instructors – subject to additional or modified terms to be specified by the assigning instructor. It may be offered for extra-credit. The amount of potential credit is to be specified by the instructor. It is expected that it may only be submission one class.

About the Great American Eclipse

This event will encompass America on August 21, 2017, featuring at least a partial eclipse for the entire United States – where the Moon temporarily covers at least a fraction of the Sun’s bright photosphere. Here is a website dedicated to the [Great American Eclipse](#), here is an [article about this in Sky & Telescope Magazine](#), and here is the [NASA website](#) for this. Such an eclipse has not occurred since 1918! Here is the [Wikipedia article on Solar Eclipses](#).

Within a ~70 mile wide “path of total eclipse”, a total eclipse of the Sun can be observed for up to 2 minutes and 40 seconds on 7/21/17, where the Moon covers all of the Sun’s bright photosphere, creating a unique and dramatic viewing opportunity – see this [description of the splendor of totality](#). The difference between experiencing a partial eclipse and a total eclipse has been described as the difference between almost dying, and actually dying. The disk of totality comes ashore in Oregon at 10:16 am PDT, travels in a southeasterly direction across the entire USA at a supersonic velocity, going offshore 93 minutes later in South Carolina at 2:49 pm EDT, touching a dozen states along the way: Oregon, Idaho, Wyoming, Nebraska, Kansas, Missouri, Illinois, Kentucky, Tennessee, Georgia, North Carolina, and South Carolina. NASA provides an [interactive map showing the path of total eclipse and providing eclipse details for any location you click on](#) (the time given there is UT – subtract 4 hours for EDT).

Although a total eclipse is safe to observe with your naked eyes, you need eye protection to observe up until the moment that totality begins, and you need eye protection to observe after the moment that totality ends. If you are not in the path of total eclipse, you need continuous eye protection to observe. **DURING THE PARTIAL STAGES OF THE ECLIPSE (WHEN THE BRIGHT PHOTOSPHERE OF THE SUN IS PARTIALLY VISIBLE) YOU MUST HAVE PROPER EYE PROTECTION TO AVOID PERMANENT EYE INJURY.** Here is [more information about viewing a partial eclipse](#), and here is a [NASA webpage on eye safety](#).

Eclipse glasses provide the required eye protection while allowing for an excellent view of partial eclipse. You may order them on-line, e.g., [from Amazon](#), or (perhaps) you may obtain a pair from your instructor. Another safe alternative is to [view a projection of the image of the Sun on a white surface](#) during partial eclipse, e.g., a [cereal box eclipse viewer \(here are directions for its construction\)](#).

To clearly see a solar eclipse, the Sun must be entirely free of cloud cover. If you travel to be in the path of total eclipse, a huge concern is the prospect of the Sun being free of cloud cover during the ~2 minutes of totality. The prospects for this along the path are described in [this article from Sky & Telescope](#). If you are planning to travel on 8/21/17 to the path of total eclipse, it is recommended that you consider several potential sites, and then examine the forecasts from the [National Weather Service](#) on the morning of 8/21/17 before making a final decision as to where to go. You should also consider the traffic prospects, as you will not be alone in seeking to drive to a location in this path.

Research to be done for this report prior to the eclipse

What is meant by the photosphere of the Sun?

What causes the photosphere of the Sun to disappear (either partially or totally) during a solar eclipse?

Compare and contrast a solar eclipse and a lunar eclipse.

What part of the Sun is still visible during a total solar eclipse?

Why cannot this part of the Sun be seen from the Earth except during total solar eclipse?

What do some astronomers hope to learn about this part of the Sun through observations planned for 8/21/17?

Do you expect to be able to travel to a location on the path of total eclipse on 8/21/17 (full credit is available even if your circumstances permit only observation of partial eclipse without substantial travel)?

If you do not plan to travel to the path of total eclipse, where do you plan to be? When will partial eclipse begin (C1) at this location? When will partial eclipse end (C4) at this location? Also, respond to the following questions for hypothetical travel to one regional site of your choice on the path of total eclipse.

If you do plan to travel to the path of total eclipse, respond to the following questions for your primary (preferred) location and at least one alternative site (that may have a substantially better weather forecast on the morning of 8/21/17 for the time of totality).

Questions about selected location(s) on the path of total eclipse (respond to all questions for one hypothetical site if you don't expect to be able to make this trip; respond to all

questions for two sites if you plan to travel to totality): (1) Where is this site (describe the location briefly, and give its latitude & longitude – available through the [NASA map](#))? (2) How do you plan to reach it? (3) Why was this site chosen? (4) When will partial eclipse begin there (C1)? (5) When will total eclipse begin (C2)? (6) When will total eclipse end (C3)? (7) When will partial eclipse end (C4)? (8) What is the duration of totality?

Why does the disk of totality generally move from west to east for all total solar eclipses?

How will you keep your eyes safe during your observations?

Why will [some planets and stars be visible during totality](#)?

Assigning instructor's pre-eclipse research approval initials: _____ (if submitted after the eclipse without these initials, this section will be assessed for potential partial credit - initials required prior to the eclipse unless this requirement is waved by the instructor).

Report on eclipse observations

All reports are to include responses to questions in this section.

Describe your experience observing this eclipse. At least 2 full paragraphs are required. Even if circumstances (e.g., clouds) prevented an actual observation, you should describe your attempt.

Draw a sketch of what you observe during any specific moment during partial eclipse.

Why was a total eclipse only apparent in the ~70 mile wide path of total eclipse?

Why does a solar eclipse not happen every month?

Why are some solar eclipses only partial?

When will be the next total solar eclipse that you might be able to observe? Where would you like to be to observe it, and why?

Report on observations obtained during total eclipse

Respond to questions in this section only if you traveled to a location on the path of total eclipse.

To what extent was the Sun free of cloud cover during totality?

Which planets and stars did you see during totality?

What other observations and/or impressions did you have during totality? At least 2 full paragraphs are expected.

After totality has ended, draw a sketch of what you remember observing during total eclipse.