

# THROWING SHADE

Preparing for the August 21st Eclipse

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Willamette University



# Outline

- Eclipse Basics





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  - What are we talking about?





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  - How can you photograph?
  - Things to look for?
  - How to survive?
  - How can you research?!



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- Eclipse Basics
  - What are we talking about?
  - Why are they rare?
  - Why should we care?
- Upcoming eclipse
  - How can you observe?
  - How can you photograph?
  - Things to look for?
  - How to survive?
  - How can you research?!
- Closing Remarks



Upcoming:

## Eclipse Basics



# What is an Eclipse?

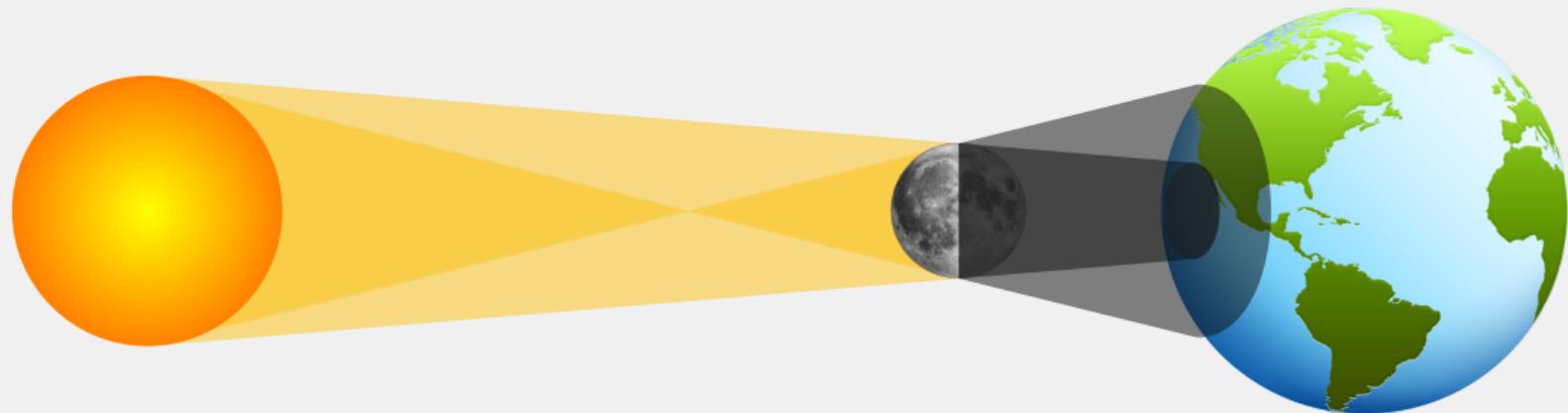
- In short, we are talking about a shadow
  - Cast by Earth ⇒ Lunar Eclipse
  - Cast by Moon ⇒ Solar Eclipse





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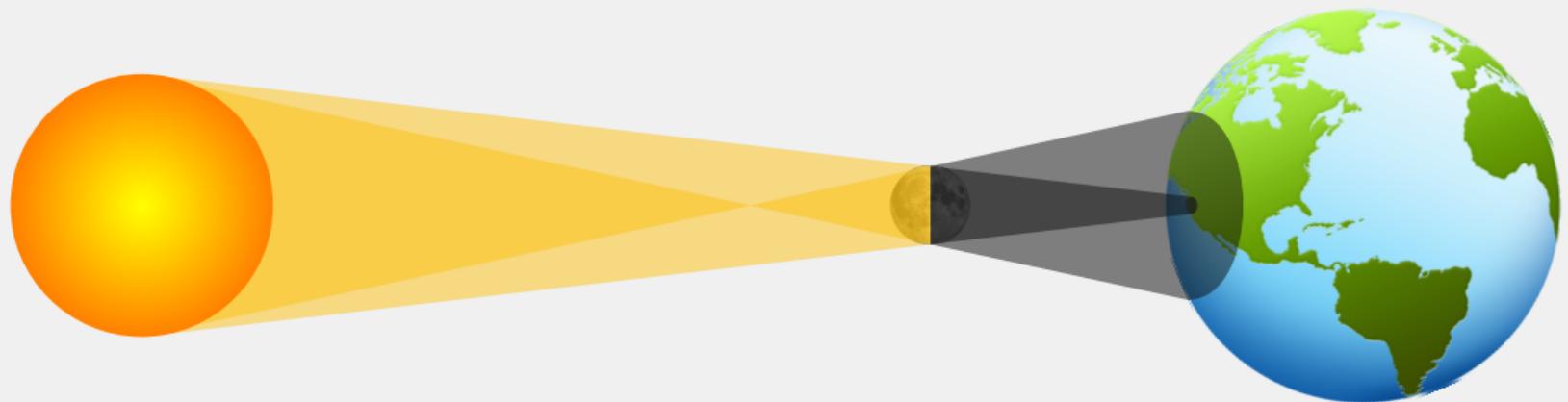
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# But why so uncommon?

- Geometry?



<https://goo.gl/Hq6ma1>



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# But why so uncommon?

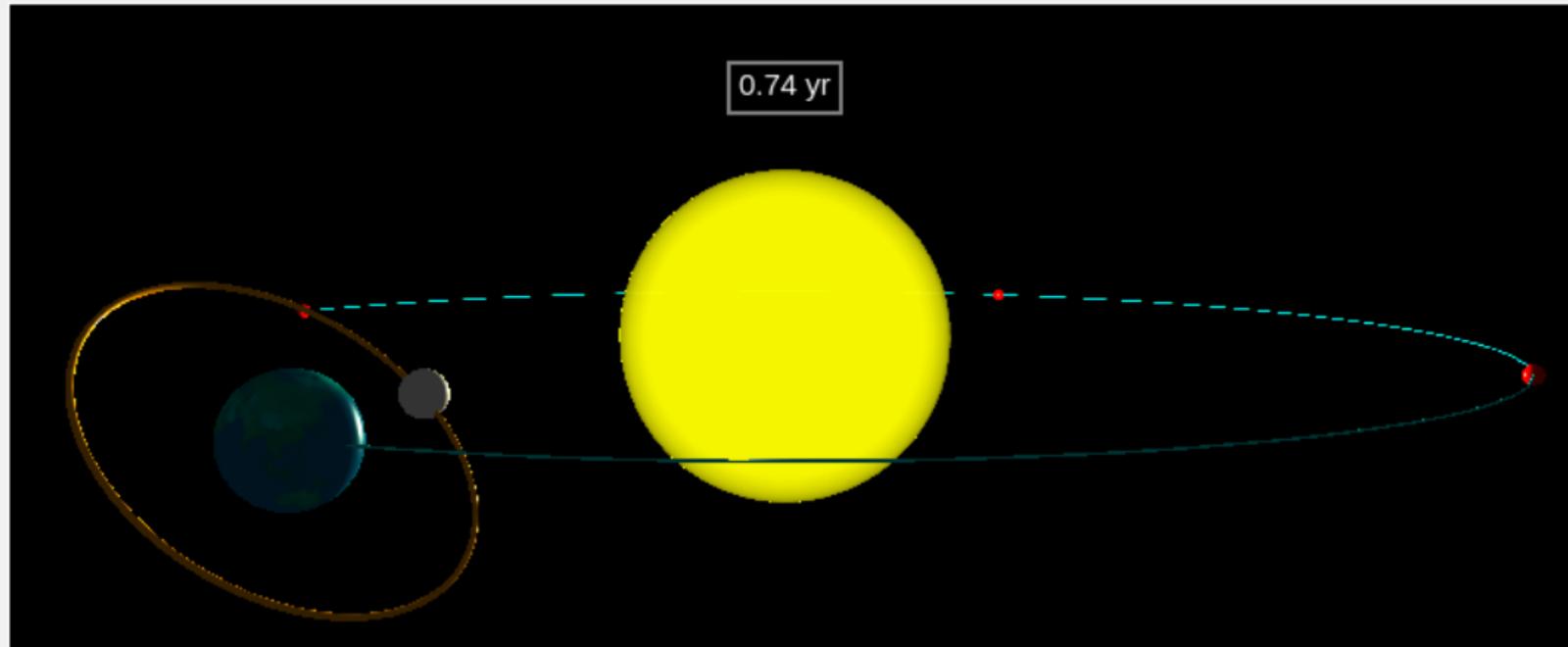
- Geometry?
  - Actually doesn't work
  - Would see 2 eclipses each month
- Need to account for Moon's orbital tilt!
  - Leads to only twice a year an eclipse *could* happen
  - Depends on the lunar phase being just right during that little window



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# Eclipse Geometry

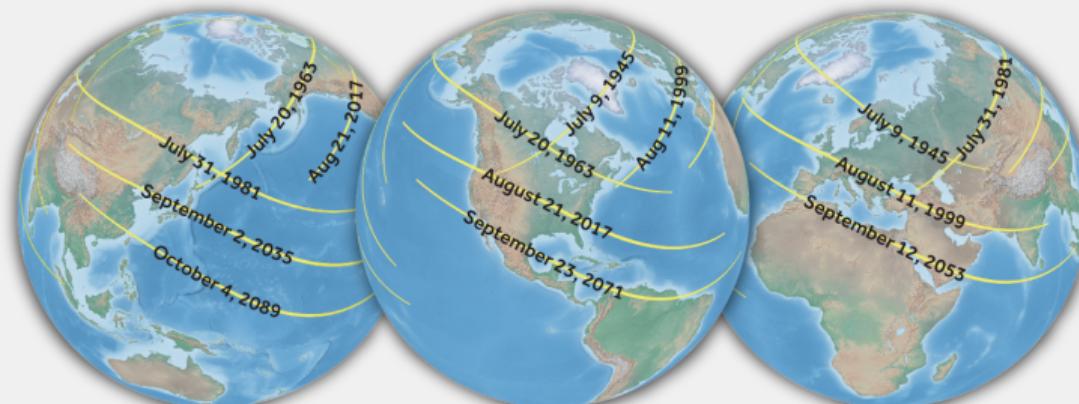




# Saros Cycle

- Length of Lunar cycle and length of Earth's orbit give time between Eclipses
- Comes out to be about 18 years, 10 days and 8 hours
- Fraction of day means the location on Earth moves each cycle
- Known as the Saros cycle
  - Has been known about since ancient times

Saros Cycle 145



Credit: [www.greatamericansolareclipse.com](http://www.greatamericansolareclipse.com)



# Why do we care?

- Likely the most apparent reminder that our planet is part of something greater
- Lots of science that can be done!
  - Only time the Sun's corona is easily visible
    - Information about solar flares, solar wind, and solar weather in general
    - Affects Earth satellites, astronauts, aurora
  - Studies of the Earth's atmosphere reacting to solar energy
    - Balloons being sent up to measure cooling and heating
    - Live-streaming footage of the shadow on Earth from the edge of space!
  - High precision information about lunar terrain
  - Potential for rare astronomy on stars or planets that tend to be near the Sun and thus invisible

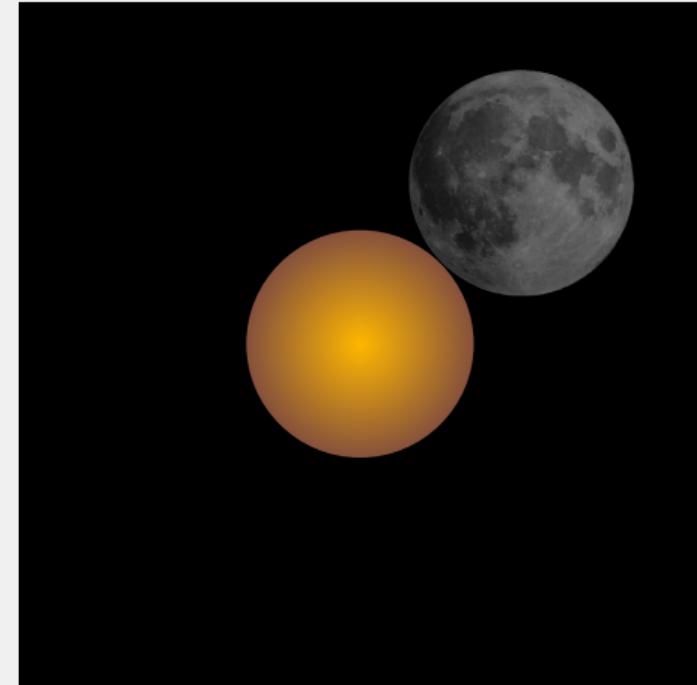
Upcoming:

# The Upcoming Eclipse!



# The Facts

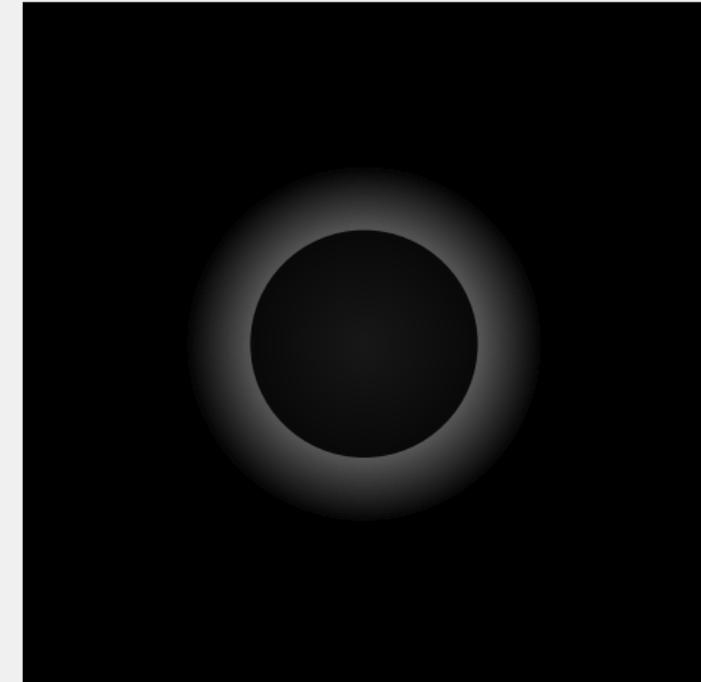
- First Contact: 9:05:26am





# The Facts

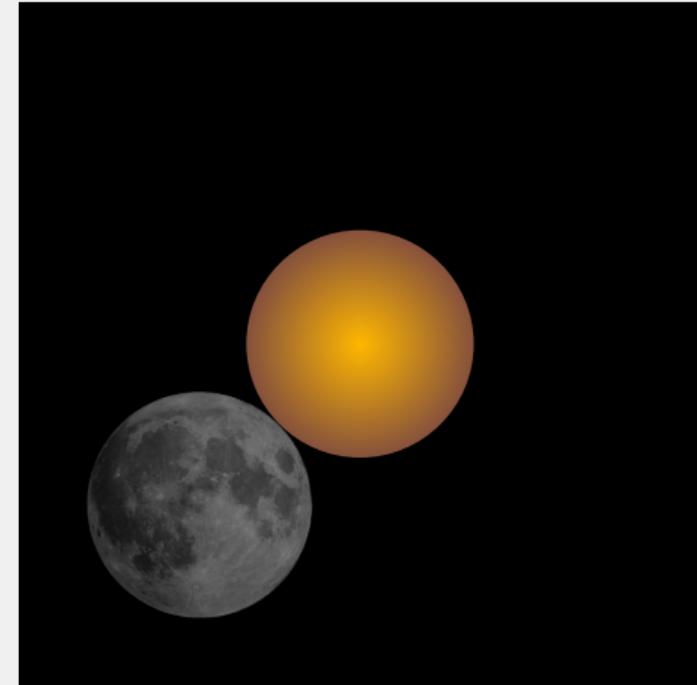
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- Start of Total: 10:17:19am
- Midpoint of Total: 10:18:16am
- End of Total: 10:19:13am





# The Facts

- First Contact: 9:05:26am
- Start of Total: 10:17:19am
- Midpoint of Total: 10:18:16am
- End of Total: 10:19:13am
- Last Contact: 11:37:46am
- Duration of Totality: **1 min 54 sec**





# Observing Locations

Things to keep in mind:

- The sun will be about halfway up in the sky, just South of due East, so make sure you aren't behind a building or tall tree!
- Being near water may be good, or it may be bad. I've read some accounts of the cooling causing steam to come up off the water, obscuring things
- Scientific demonstrations, experiments and viewing will be happening on the Willamette North Lawn
- Plan ahead, and consider walking if possible, because things will probably be *crazy*.



# How to Observe

- During totality, you are free to look at the Sun directly without harm
- But special viewing equipment needed prior to totality



Credit: [Amazon.com](#)



# How to Observe

- During totality, you are free to look at the Sun directly without harm
- But special viewing equipment needed prior to totality
- Let me repeat:

## Alert!

You need special equipment to view the eclipse before or after totality! Sunglasses will not suffice!



Credit: [Amazon.com](https://www.amazon.com)



# Do NOT view using:

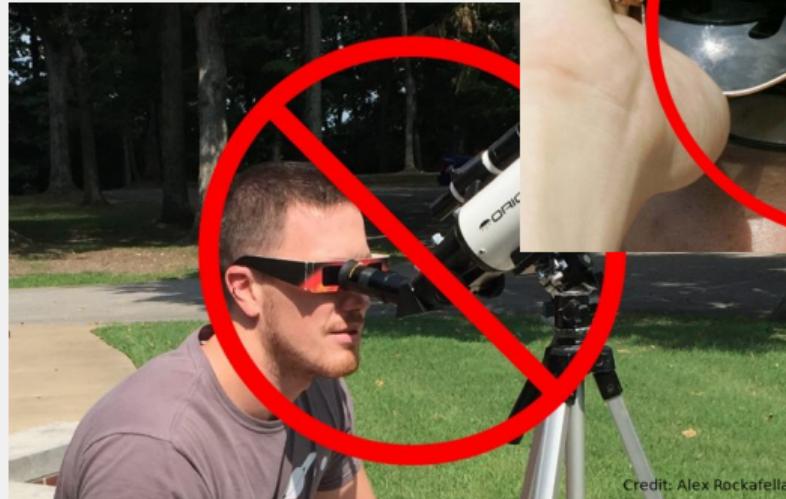


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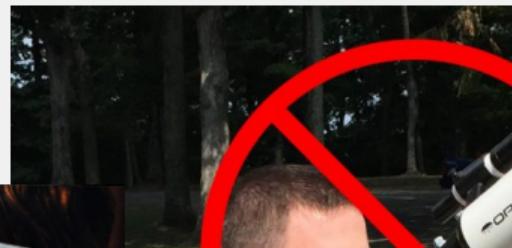


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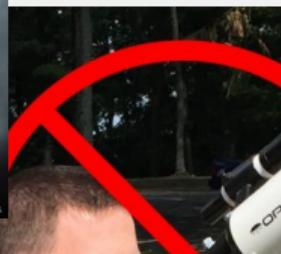


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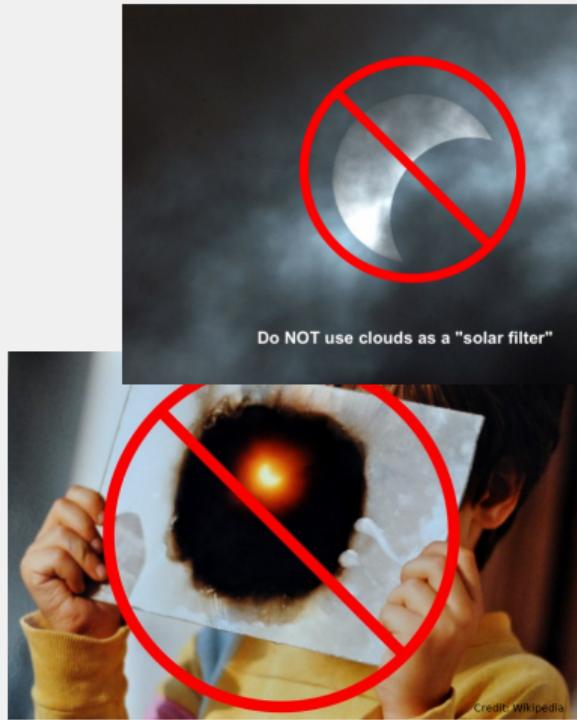


# Do NOT view using:





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# DO view using:

- Solar Eclipse viewing glasses
- Welding masks (shade 14 or darker)
- Telescopes or binoculars *with solar filters attached*
- Pin-hole boxes
- Mirror projection
- Colander!

## Rule of Thumb

Basically, if you wouldn't want to look at the Sun normally through something, don't look at the eclipse before or after totality with that same something!



# Photography

- My short recommendation: Don't try too hard
  - Getting great eclipse pictures is *tough*
  - You only have 2 minutes to appreciate a probably once in a lifetime event
  - Spend a second or two snapping a shot if you want, but then just observe everything around you!
- If you do want to try your luck though:
  - Shots before or after totality need the same protection as your eyeballs!
  - **Do not use any flash!**
  - You'll want a tripod
  - You'll likely want at least a 300 mm focal length lens for the Sun to be a decent size in the field of view
  - Focus on the Moon in the nights beforehand and tape down the focus position
  - Make sure everything is covered and protected again before totality finishes



# Some Things to Look For



Credit: *Ed Morana*

- Tree pinhole cameras!



# Some Things to Look For



Credit: *Mitzi Adams*

- Tree pinhole cameras!
- First and Last Contact



# Some Things to Look For



Credit: *Pedro Ré*

- Tree pinhole cameras!
- First and Last Contact
- The Diamond Ring



# Some Things to Look For



Credit: *Ragnar Axelsson*

- Tree pinhole cameras!
- First and Last Contact
- The Diamond Ring
- Baily's Beads



# Some Things to Look For

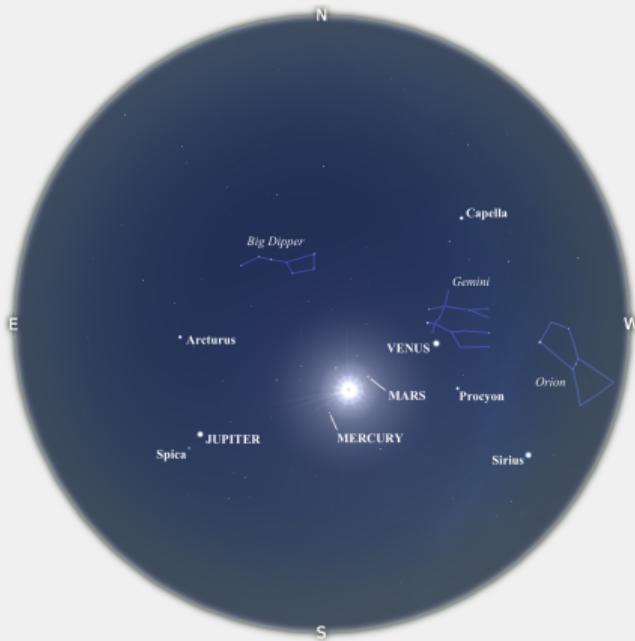


Credit: *NASA Goddard Space Flight Center*

- Tree pinhole cameras!
- First and Last Contact
- The Diamond Ring
- Baily's Beads
- The Solar Corona



# Some Things to Look For



Credit: *Billy Teets*

- Tree pinhole cameras!
- First and Last Contact
- The Diamond Ring
- Baily's Beads
- The Solar Corona
- Planets!



# Effects of the Eclipse

- Slight lowering of local temperatures (thank goodness...)
  - Can lead to an odd "eclipse wind" or breeze
- Animals tend to assume nightfall and adopt that behavior
  - Birds quiet, wildlife head towards nightly resting grounds, etc
  - The return of the sun 2 minutes later can leave animals in some confusion and apprehension
- People's responses vary. Speechless, screaming, fear, goosebumps, and a sense of sharing in the moment have all been used to describe reactions.



# Descriptions

*An assembled crowd is awed into silence almost invariably. Trivial chatter and senseless joking cease. Sometimes the shadow engulfs the observer smoothly, sometimes apparently with jerks; but all the world might well be dead and cold and turned to ashes. Often the very air seems to hold its breath for sympathy; at other times a lull suddenly awakens into a strange wind, blowing with unnatural effect.*

*Then out upon the darkness, gruesome but sublime, flashes the glory of the incomparable corona, a silvery, soft, unearthly light, with radiant streamers, stretching at times millions of uncomprehended miles into space, while the rosy, flame-like prominences skirt the black rim of the moon in ethereal splendor.*

*Mabel Loomis Todd - Total Eclipses of the Sun, 1894*



# How to Survive!



GameWalls.com | Image by JTLG

Credit: [breakoutfortmc.com](http://breakoutfortmc.com)



# Recommendations

- Estimates are for a million people
  - Oregon normally has a population of 4 million
  - Most will be coming here to Salem or Madras
- Traffic is likely to be horrible if moving at all. Prepare accordingly
- Don't do anything dumb. Paramedics, fire departs, etc will be overworked and similarly encumbered
- You may want to make any grocery runs before the weekend of the eclipse
- Cell phone networks may be stressed
- Basically, prepare. It is going to be quite a thing. Think of it as a mild dry run for your disaster planning...



# Help Science!

- Check out the work being done on the North Lawn of Willamette, but be respectful of the work people are doing
- Understand that for many eclipse scientists, the event is rather stressful with all the data they need to try to collect in a very small time frame!
- Want to get involved yourself? Check out the GLOBE Observer app on your phone:

<https://observer.globe.gov/about/get-the-app>

- Solar Eclipse portion to be released on August 18
- Mainly interested in cloud observations or temperature observations in the hours before and after the eclipse.



# Have Fun!

- Plan ahead
  - You will probably be less stressed if you don't drive anywhere
  - Ensure you'll have a view to the East without trees, buildings, or street lights
- Make sure you have proper viewing equipment
- Don't get caught up in trying to take the perfect picture
- Take a moment to look down during totality to observe everyone around you
- Make it memorable! (safely!)



# Questions?

- Links

- Tilt Simulation: <https://goo.gl/Hq6ma1>
- NASA Streams: <https://eclipse2017.nasa.gov/eclipse-live-stream>
- Balloon Stream: <http://eclipse.stream.live/>