Solar Eclipse Activities for Community Outreach Events

TSAAPT Fall Meeting 2023

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Kenric Davies

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- Current Position: Program Coordinator for aggieTEACH-Arts & Sciences at Texas A&M University
- NSTA Solar Eclipse Partner

Resources

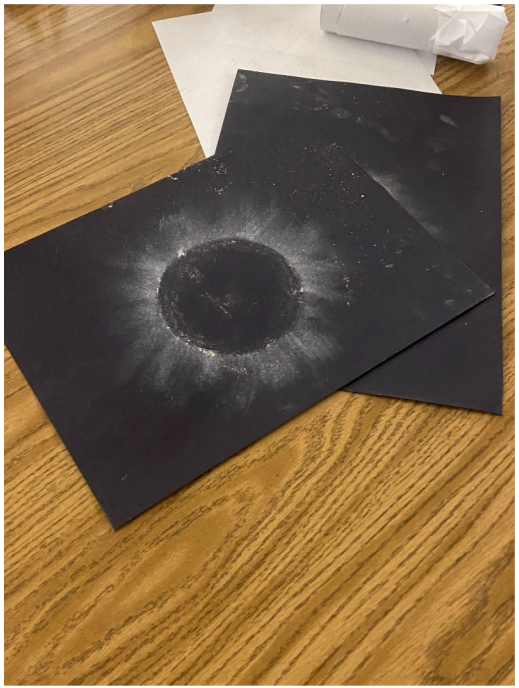
Slides

https://bit.ly/EclipseActivities

Virtual Handout

https://bit.ly/EclipseActivitiesHandout

Eclipse Chalk Art - NASA Resource



Materials Needed:
Cardstock or thin cardboard, black construction paper, chalk, scissors, pencil, round object for tracing.

Optional: Tissues.

https://science.nasa.gov/resource/eclipse-chalk-art/

UV Bead Bracelets

Create bracelets using regular colored and UV sensitive beads.

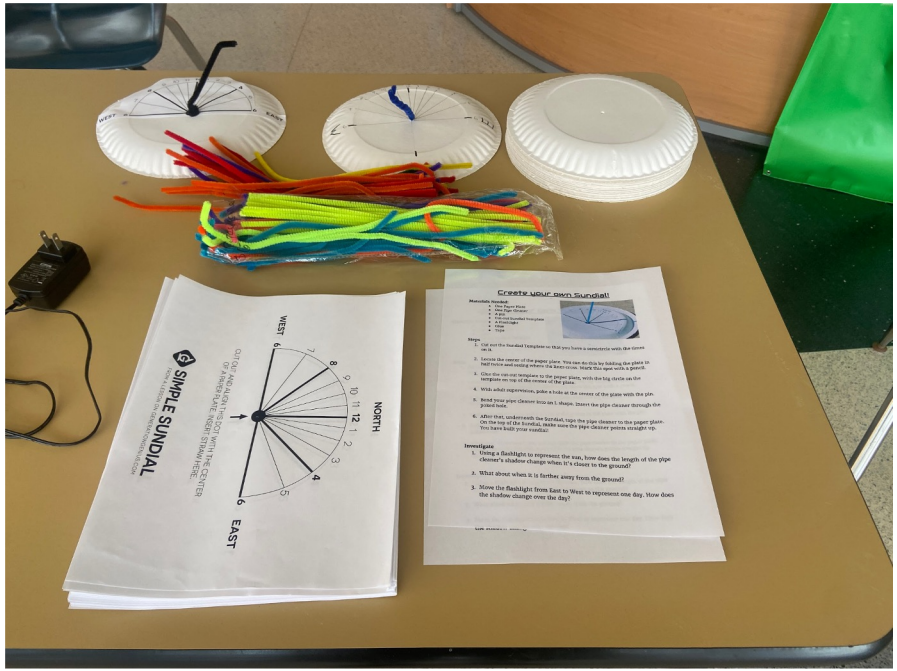
During the eclipse, have participants make observations of how the color of UV beads changes.

Does the color completely fade back to white?

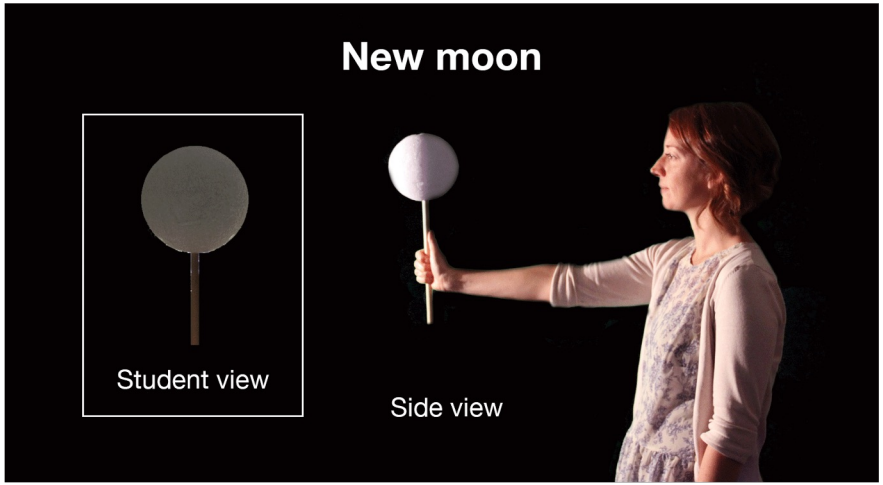
UV Beads can be found on AMAZON or local craft/hobby store

Make Your Own Sundial

Using a plate and pipe cleaner, make a sundial that can tell solar time from your location.



Moon Phase Modeling



There are many misconceptions involving what causes the Lunar Phases.

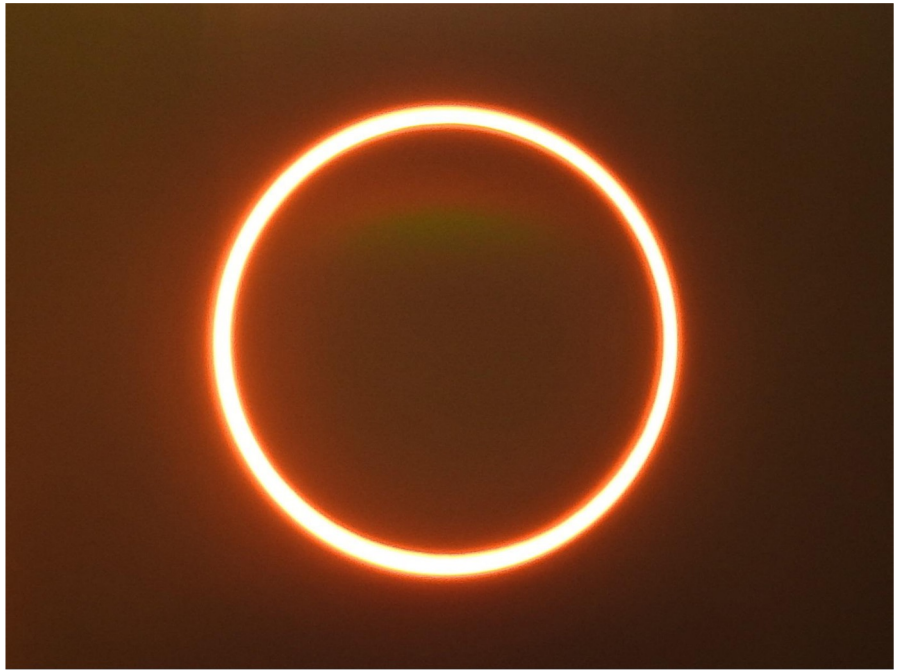
Physical modeling helps participants understand what causes the progression of the shadow across the visible lunar surface and tie it to the orbit of the Moon around the Earth.

Eclipse Modeling

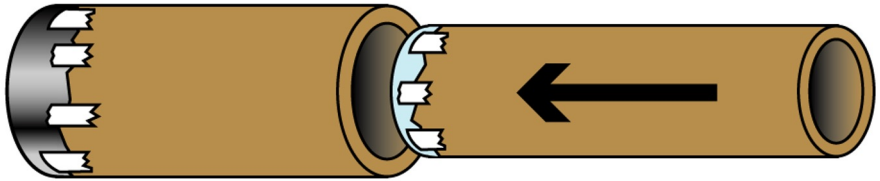
Using scale models of the Earth and Moon, we will investigate what orientation of objects creates the two types of eclipses.

Safe Solar Viewing Methods

Available outside will be several methods to safely observe the Sun that could be used during the upcoming eclipses.



Easy Pinhole Camera



Using two cardboard tubes, wax paper, aluminum foil and tape, participants can create their own Pinhole Camera to safely observe the Sun and, more specifically, the Solar Eclipse

Plenty of video tutorials or use these written instructions.

Sun Funnel

Materials

- Funnel
- Large and Small hose clamps
- rear-surface projection screen material
- All-metal-and-glass telescope eyepiece

This simple & inexpensive device makes it easy for many people to observe the Sun simultaneously — and safely!

Find instructions for how to make this HERE!

Pinhole Mirror

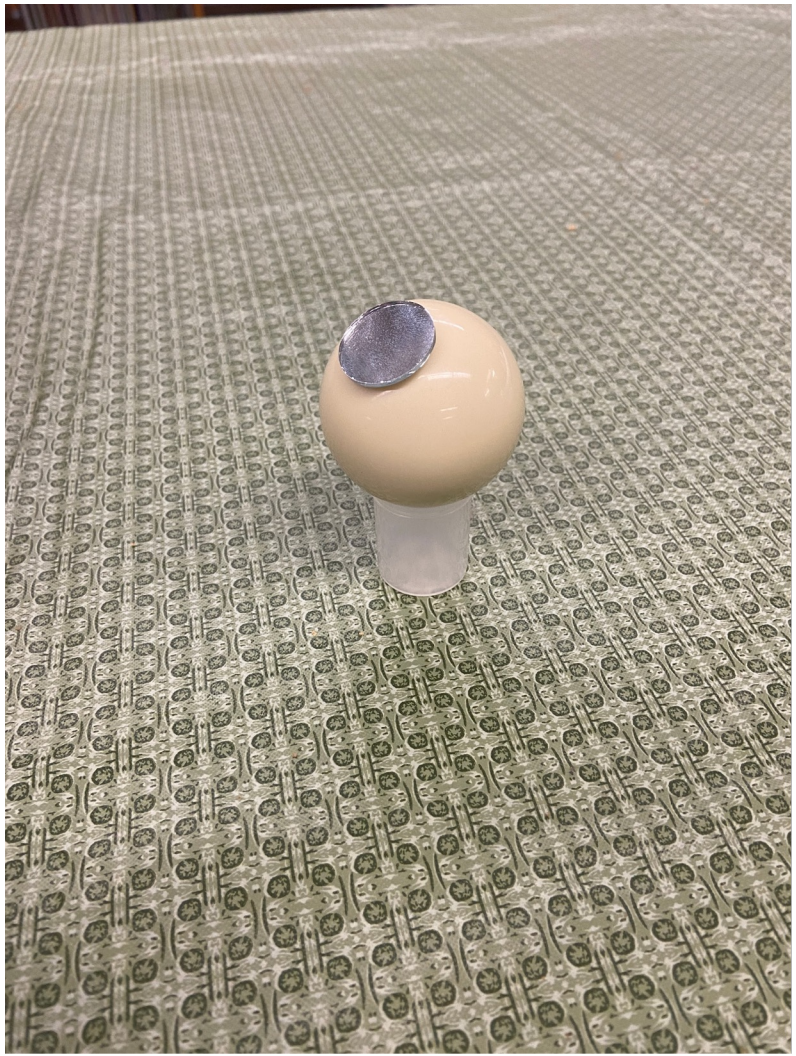
Materials:

Heavy Ball (Cue Ball)
Small Craft Mirror
Super Glue
Stand

Setup:

Glue the small craft Mirror to the ball.
Place the ball on the stand and orient to reflect the Sun onto a wall.

SAFETY NOTE: Reflect the Sun image high and away from public areas to prevent focused sunlight reaching eyes by accident.



Solar Filters for Telescopes

When using a telescope to view the Sun, you must use a solar filter to reduce the amount of sunlight entering the telescope and the viewers eyes.

HERE is a website to help choose a the right solar filter for your telescope.

Other Solar Activities

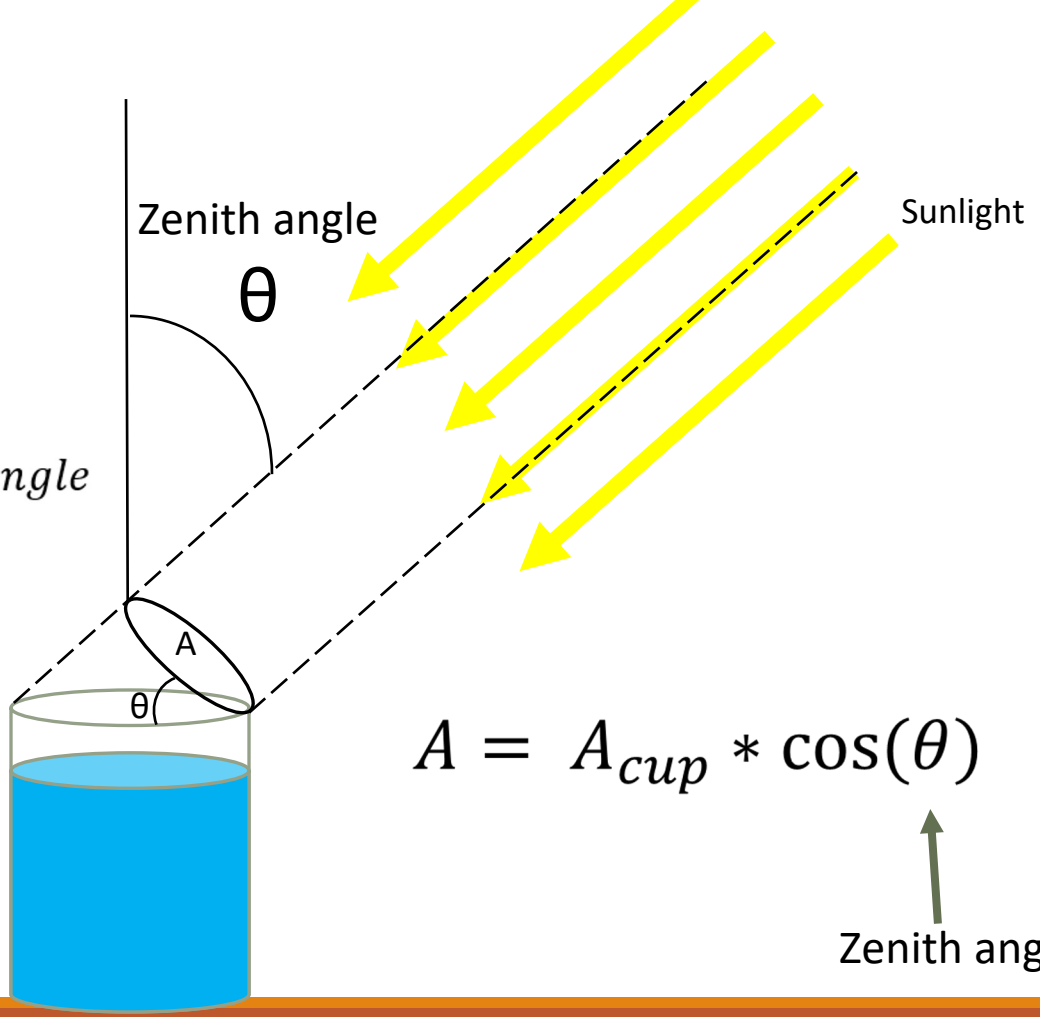
Determining the Surface Temperature of the Sun

The only materials you need are a cup of cold water and a meter stick!

https://bit.ly/SunTempSlides

Use Stellarium to look up the Altitude for the Sun on June 25, 2023 at time of measurement.

$$Zenith\ Angle = 90° - Altitude\ Angle$$



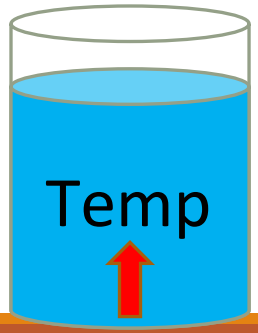
$$A = A_{cup} * \cos(\theta)$$

Zenith angle

$$Energy\ given\ by\ sun = Energy\ absorbed\ by\ water$$

$$Flux\ * A_{cup} * \Delta t = m_{water} * C_{water} * \Delta Temp$$

$$Flux = \frac{m_{water} * C_{water} * \Delta Temp}{A_{cup} * \Delta t}$$

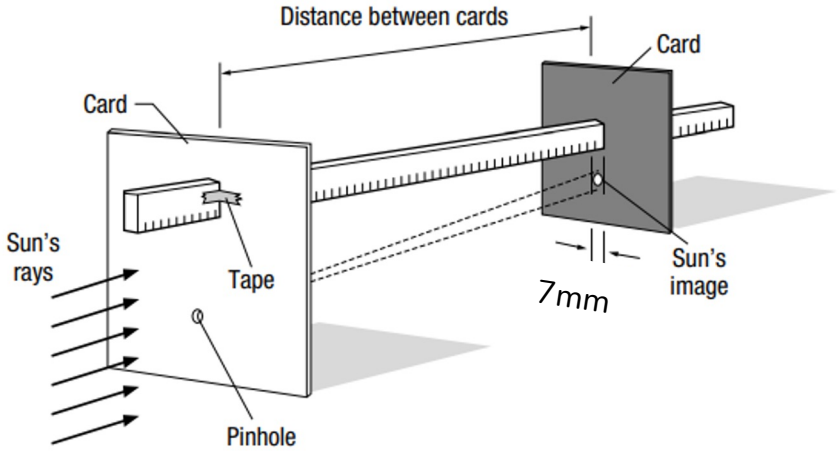


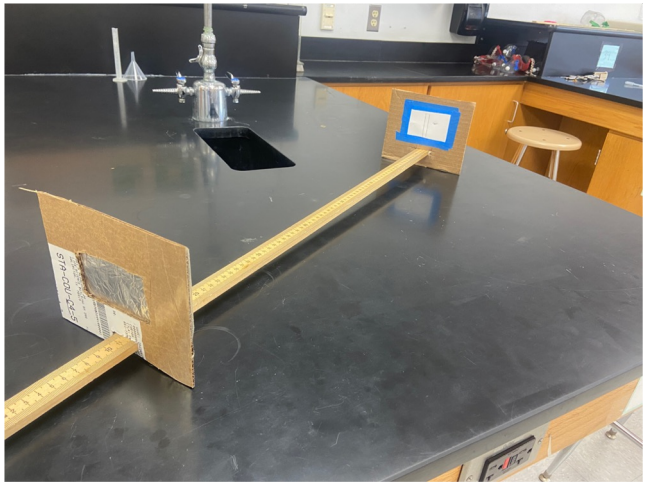
The data was taken on a nice clear day. Use the Atmospheric Transmission Table to find a better

$$Solar\ Flux = \frac{calculated\ Flux}{X}$$

Measuring the Diameter of the Sun

Using a known value for the distance between the Earth and the Sun and the concept of ratios, you will determine the diameter of the Sun.






eclipse
THROUGH THE EYES OF NASA
NASA
CANADA
2023 Annular Solar Eclipse
2024 Total Solar Eclipse
9:15 AM PDT
9:20 PDT
9:25 PDT
10:30 MDT
10:35 MDT
10:40 MDT
11:45 CDT
11:50 CDT
11:55 CDT
12:00 CDT
12:05 PM CDT
12:20 PM CST
12:25 CST
12:30 CST
1:30 CDT
1:35 CDT
1:40 CDT
1:45 CDT
1:50 CDT
1:55 CDT
2:00 CDT
2:05 CDT
3:05 EDT
3:10 EDT
3:15 EDT
3:20 EDT
3:25 EDT
3:30 EDT
4:35 PM ADT
UNITED STATES
MEXICO
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
2023 Maximum Partial Obscuration (%)
2024 Maximum Partial Obscuration (%)
The 2023 & 2024
Solar Eclipses
through the eyes of NASA
Lunar topography data from NASA's Lunar Reconnaissance Orbiter and the Japan Aerospace Exploration Agency's SELENE lunar orbiter were used to precisely calculate the location of the Moon's shadow for the 2023 and 2024 solar eclipses. The planetary positions are from NASA's Jet Propulsion Laboratory Development Ephemeris 421. Earth imagery from NASA's Blue Marble: Next Generation series were used to create the terrain and Earth at night imagery from NASA's Black Marble were used under the eclipse paths.
2023 Annular Solar Eclipse
Saturday, October 14, 2023
2024 Total Solar Eclipse
Monday, April 8, 2024
Credit: Michala Garrison and the Scientific Visualization Studio (SVS), in collaboration with the NASA Heliophysics Activation Team (NASA HEAT), part of NASA's Science Activation portfolio
Eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center
0 mi 200
0 km 200
2023 Path of Annularity October 14, 2023
Along a path about 125 miles wide, the Sun will appear as a "ring of fire" in the sky. Annularity lasts up to 5 minutes depending on the viewer's location within this path.
2024 Path of Totality April 8, 2024
Along a path about 115 miles wide, the Moon will completely block the Sun in the sky. Totality lasts up to about 4 minutes and 28 seconds depending on the viewer's location within this path.
Outside of these paths, viewers within the 48 contiguous U.S. states and many other areas will see a partial solar eclipse (in the shaded areas below).
Find More: solarsystem.nasa.gov/eclipses
NP-2022-11-909-GSFC

What ideas do you have?