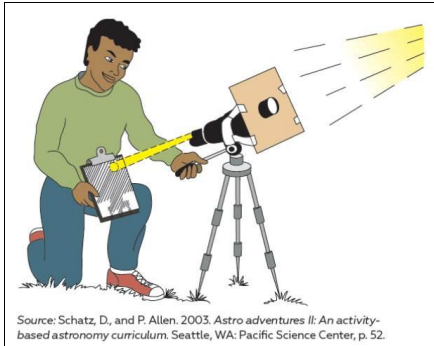


## SELECTED ECLIPSE ACTIVITIES FOR EDUCATORS

A Guide by Andrew Fraknoi (Jan. 2023)

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### Activities about Eclipses and Viewing them Safely

*The Yardstick Eclipse: How Eclipses Work.* From the Astronomical Society of the Pacific (requires a yardstick and other household items to model how eclipses happen):

[https://astrosociety.org/file\\_download/inline/083a7833-c1a7-4270-aa5a-d48e036e424a](https://astrosociety.org/file_download/inline/083a7833-c1a7-4270-aa5a-d48e036e424a) An article discussing a student-centered version of this activity can be found at: <https://eclipse.aas.org/sites/eclipse.aas.org/files/Miranda-et-al-SS-Oct2016.pdf> An elegantly laid-out version of the yardstick activity is at: <https://nso.edu/wp-content/uploads/2018/10/YardstickEclipse.pdf>

*Modeling Eclipses.* From the Pacific Science Center & Dennis Schatz (use hula hoops and other easy material to teach about why eclipses are rare):

<https://eclipse.illinois.edu/ProjectASTRO-ModelingEclipses.pdf>

*How Can the Little Moon Hide the Giant Sun?* From NASA Sun-Earth Day (making a simple scale model of the Sun and Moon and using them for comparisons and calculations):

[https://sunearthday.nasa.gov/2007/materials/eclipse\\_smallmoon\\_bigsun.pdf](https://sunearthday.nasa.gov/2007/materials/eclipse_smallmoon_bigsun.pdf)

(Or: [https://lawrencehallofscience.org/wp-content/uploads/2022/06/diy\\_ss\\_bigsun\\_smallmoon.pdf](https://lawrencehallofscience.org/wp-content/uploads/2022/06/diy_ss_bigsun_smallmoon.pdf))

(Or: <https://www.nisenet.org/catalog/exploring-solar-system-big-sun-small-moon> )

*Solar Eclipses.* A Science Snack from the Exploratorium (two people use their thumbs to create eclipses): <https://www.exploratorium.edu/snacks/solar-eclipses>

*How to View an Eclipse with a Cereal Box.* From NASA Goddard (video and transcript):

<https://svs.gsfc.nasa.gov/12638> Or see a written & illustrated version at:

[http://hilaroad.com/camp/projects/eclipse\\_viewer/eclipse\\_viewer.html](http://hilaroad.com/camp/projects/eclipse_viewer/eclipse_viewer.html)

*Build a Pinhole Viewer.* From the University of Illinois (using a long tube):

<http://eclipse.illinois.edu/pinhole.html>

*Pinhole Viewer: Shoebox Version.* From the Space Science Institute and the book *Solar Science*, published by National Sci. Teaching Assn. Press (make safe sun viewer from a shoebox): <http://clearinghouse.starnetlibraries.org/astronomy-and-space/114-pinhole-projection-in-a-box.html>

*Using a Sunspotter Telescope for Safe Viewing.* From Robert (Barlow Bob) Godfrey: (use a commercial, but not very expensive, telescope for viewing the Sun safely any time): <http://www.cnyo.org/2013/09/20/barlow-bobs-corner-x-2-the-sunspotter-solar-telescope-activity-for-the-sunspotter-solar-telescope/>

*Make your Own Safe Solar Viewer.* From T. R. Richardson, College of Charleston. (Making a solar projector, for \$10 of surplus materials, that can show the public the Sun): [https://richardson.people.cofc.edu/safe\\_solar\\_folder/index.html](https://richardson.people.cofc.edu/safe_solar_folder/index.html) (Another projector project, using binoculars, is from the Exploratorium – click on the video at the top of the page: <https://www.exploratorium.edu/eclipse/how-to-view-eclipse> )

*Instructions for Building a Sun Funnel for Your Telescope.* From the American Astronomical Society (detailed instructions on building a nice projection screen for showing the Sun with a telescope; for people who have some construction skills and know how to use an amateur telescope): <https://eclipse.aas.org/sites/eclipse.aas.org/files/Build-Sun-Funnel-v3.2.pdf>

*Do-It-Yourself Sun Science.* From NISENet (download an app, or get pdfs for doing a variety of sun-related activities, including looking at real-time images of sunspots from a space mission): <https://www.nisenet.org/diy-sun-science-app>

*Bear's Shadow.* From NISENet (for really young children, this activity, from a picture book, helps them think about how shadows – the essence of eclipses – happen: <https://www.nisenet.org/catalog/exploring-earth-bears-shadow>

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## **Activities for Getting to Know the Moon**

*Exploring Lunar Phases with a Daytime Moon.* From the Astronomical Society of the Pacific (use plastic balls on sticks to model the phases of the Moon in the sky): [https://astrosociety.org/file\\_download/inline/d135613e-3498-4413-b520-d85979c7f131](https://astrosociety.org/file_download/inline/d135613e-3498-4413-b520-d85979c7f131)

*Does the Moon Rotate?* From the Night Sky Network (requires plastic “moon balls” and Earth globe): <https://nightsky.jpl.nasa.gov/docs/MoonRotate.pdf>

*Why Does the Moon Have Phases?* From the Night Sky Network (also requires plastic balls): <https://nightsky.jpl.nasa.gov/docs/MoonPhases1.pdf>

*Observing and Understanding the Causes of Lunar Phases.* From Dennis Schatz, Pacific Science Ctr. (observing, modeling, and understanding the phases of the Moon): <http://www.dennisschatz.org/activities/Lunar%20Phases.pdf>

*Phases of the Moon.* From the University of Washington (short activity getting to know the phases through students acting out the motions):

[https://drive.google.com/file/d/1s7\\_GhT2fZ0UKqZYsjpR8hrF-ih4s37GM/view](https://drive.google.com/file/d/1s7_GhT2fZ0UKqZYsjpR8hrF-ih4s37GM/view)

*Make a Moon-phase Calendar and Calculator.* From NASA's Jet Propulsion Lab (construct from a master you can print out):

<https://www.jpl.nasa.gov/edu/learn/project/make-a-moon-phases-calendar-and-calculator/>

*Earth's Bright Neighbor.* From the Lunar & Planetary Institute (make a scale model of the Earth-Moon system using common fruits):

<https://www.lpi.usra.edu/education/explore/marvelMoon/activities/whatIf/brightNeighbor/>

*Penny Moon.* From the Lunar & Planetary Institute (model the Moon's synchronized motions using coins):

<https://www.lpi.usra.edu/education/explore/marvelMoon/activities/moonMyths/pennyMoon/>

*Lunar Photography Guide.* From NASA (includes detailed instructions for cell phones and more sophisticated cameras): <https://moon.nasa.gov/moon-observation/photography-guide/>

*Creating Craters.* From *My Sky Tonight* at the Astronomical Society of the Pacific (on how craters are made and erased):

[https://astrosociety.org/file\\_download/inline/d6746e97-ad52-4065-af3a-c60ef11cf52d](https://astrosociety.org/file_download/inline/d6746e97-ad52-4065-af3a-c60ef11cf52d) Also see *Craters on the Earth and Moon* from JPL for older audiences: <https://nightsky.jpl.nasa.gov/docs/CratersMoonEarth.pdf> )

*Did We Actually Land on the Moon?* From the Astronomical Society of the Pacific (using web resources to investigate and debunk moon-landing denial theories):

[https://www.researchgate.net/publication/268895007\\_Did\\_We\\_Actually\\_Land\\_on\\_the\\_Moon\\_An\\_Activity\\_and\\_Symposium](https://www.researchgate.net/publication/268895007_Did_We_Actually_Land_on_the_Moon_An_Activity_and_Symposium)

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## **Activities for Getting to Know the Sun**

*Scale Model of the Sun and Earth.* From NASA Sun-Earth Day (making a model that shows size and distance to scale):

[https://sunearthday.nasa.gov/2007/materials/solar\\_pizza.pdf](https://sunearthday.nasa.gov/2007/materials/solar_pizza.pdf)

*Where Does the Sun Set?* From the Canadian *Discover the Universe* Project (keeping track of where on the horizon we see the Sun):

[https://www.discovertheuniverse.ca/files/ugd/c07f8f\\_750cbda1358f43ffa1d96573c7d20c52.pdf](https://www.discovertheuniverse.ca/files/ugd/c07f8f_750cbda1358f43ffa1d96573c7d20c52.pdf)

*What Color is the Sun?* From the Stanford Solar Center (student investigation into the colors of the Sun, of water, and the sunset): <http://solar-center.stanford.edu/activities/SunColor/What-Color-is-the-Sun.pdf>

*Measuring the Sun's Size.* From the Lawrence Hall of Science (using a pinhole viewer and some geometry):

[https://www.nisenet.org/sites/default/files/catalog/uploads/diy\\_ss\\_measure\\_sun\\_size.pdf](https://www.nisenet.org/sites/default/files/catalog/uploads/diy_ss_measure_sun_size.pdf)

*Discover the Sunspot Cycle and How Fast Does the Sun Rotate?* From the book *Solar Science* by Dennis Schatz and Andrew Fraknoi (two sample activities, using images of the Sun with sunspots to understand more about the Sun's activity and rotation):

<https://static.nsta.org/pdfs/samples/PB403Xweb.pdf>

*Making a Sun Clock.* From Dennis Schatz (using shadows and a dial to tell time):

<http://www.dennisschatz.org/activities/Pocket%20Sun%20Clock.pdf> (See also:

*Equatorial Sundial.* From the McDonald Observatory (construct and use a sundial, with the master design provided):

<https://stardate.org/sites/default/files/pdfs/teachers/EquatorialSundial.pdf>

*A Family Guide to the Sun.* From the Space Science Institute Space Weather Center (a booklet of puzzles, pictures, poetry and projects for kids aged 6-13):

<http://www.spaceweathercenter.org/education/02/02.html>

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### **Educational Resources that are Not Activities:**

*National Solar Observ. Educational Videos:* <https://nso.edu/for-public/eclipse-webcast/>

*Eclipse Training Resources* from the Rice University Space Institute:

[https://space.rice.edu/eclipse/eclipse\\_training.html](https://space.rice.edu/eclipse/eclipse_training.html)

*Eclipse Resources from the Exploratorium* (includes an excellent series of very short videos about individual concepts; scroll down the page to get to them):

<https://www.exploratorium.edu/eclipse>

*When The Sun Goes Dark.* From the National Science Teaching Association Press (a book for kids by A. Fraknoi & D. Schatz on understanding how eclipses happen):

<https://my.nsta.org/resource/108257>

American Astronomical Society Eclipse Web Pages (with information, links, authoritative safety guide, and free images): <https://eclipse.aas.org/>

Finding the Circumstances for any Upcoming Eclipse from your City or Region:

<https://www.timeanddate.com/eclipse/>

Project to Distribute Eclipse Glasses and Information through Public Libraries:

<https://www.starnetlibraries.org/about/our-projects/solar-eclipse-activities-libraries-seal/>

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This listing was compiled by astronomer/educator Andrew Fraknoi (with help from L. Peticolas, D. Schatz, V. White and others.) For Fraknoi's other guides for educators and more about his work, see: <http://fraknoi.com>