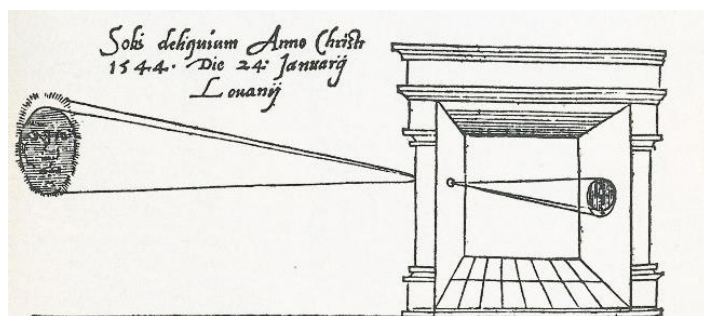


13. MAKE AN ECLIPSE VIEWER

What Is This About?

It is not safe to look directly at the sun without taking precautions to protect your eyes. The sun is far too bright to view directly. But you can build a simple pinhole projector to help you see an image of the sun, safely.

“Pinhole cameras” were originally called “Camera Obscura.” This drawing by Leonardo da Vinci of a “Camera Obscura” shows the sun projected through a pinhole onto a wall. This is just like the projector you will make.



Credit: Gemma Frisius, *De Radio Astronomica et Geometrica*, 1545.

Materials: (you provide)

- Cardboard box: carton, cereal box, shoe box. The longer the box, the larger the image of the sun.
- Scissors or box knife
- Masking or transparent tape
- 1 piece of white paper
- Pin
- Duct (opaque) tape, as needed.

Try These:

During an eclipse of the sun, any small hole will make an image of the sun. Here's some other fun ways to project images of the sun during partial eclipses.



Colander

Leaves



Crossed fingers

Credit: Public domain (top) and R.T. Fienberg (bottom)

Space Science Tie-In:

Astronomers have observed the sun with ground based observatories for about 400 years. Galileo proved that the sun rotated by observing the motion of sunspots on its surface. Today, we observe the sun in many wavelengths from large ground-based observatories like the National Solar Observatory and from spacecraft: Solar and Heliospheric Observatory, Solar Terrestrial Relations Observatory and the Solar Dynamics Observatory.

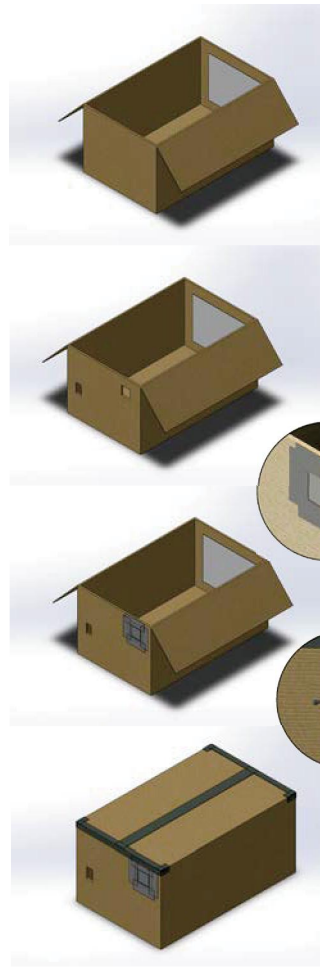
Build the Box Projector:

Any box will work. The longer the box, the larger the image of the sun. These instructions are for a cardboard box. If using a box with open seams, seal up the box with opaque tape to make the inside dark. Only the pinhole in the foil should let in light when you are looking through the viewing opening.

CAUTION:
**Never look at the sun
without eye protection.**

**It is safe to project the sun
through small holes, and
look at the projected image.**

**Never look directly at the
sun through pinholes
in paper or foil.**



Tape white paper inside on one end of box.

Cut or poke eye and sun holes.

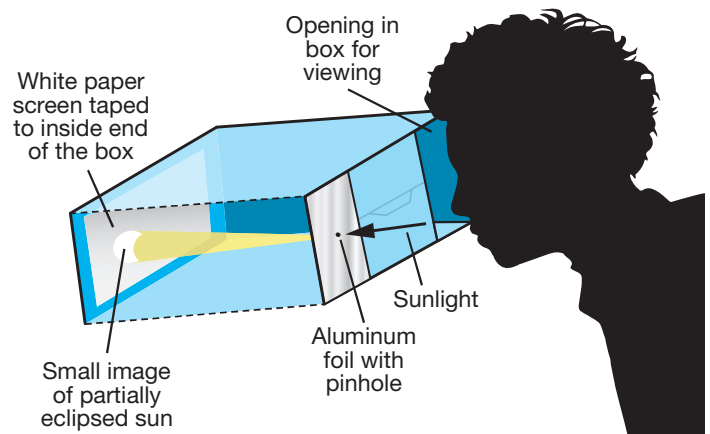
Tape aluminum foil over sun hole.

Poke hole in foil with pin.

Tape box shut to block light leaks.

To Do:

- Stand with the sun behind you.
- Point the pinhole end of the box toward the sun. Move around until, looking through the viewing opening, you see an image of the sun projected inside the box.
- An easy way to align with the sun is to make the shadow of the box and your head as small as possible.
- Your pinhole projector will show a small image of the sun that is useful during a partial eclipse to see the “bite” the moon takes out of the sun.
- The longer the box is, the larger the image of the sun will be.



Graphics: Credit: Jessica Henricks, Girl Scouts of Northern California; Conor McQuaid