



EYE RESEARCH INSTITUTE
OAKLAND UNIVERSITY

Safe Solar Eclipse Viewing

from a vision scientist

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While we hear about the dangers of watching a Solar Eclipse event, the truth is that the Sun is always dangerous to look at directly with the naked eye for more than several seconds. Fortunately, the Sun is so bright that we naturally avoid looking directly at the sun. Our pupils get very small, and the Sun is so uncomfortable to stare at that we tend to look away. If you forced yourself to stare at the sun for a long time, you could easily damage your retina. Why do people mostly damage their retina from Solar light during an eclipse?

During an eclipse, the sky gets darker in the Moon's shadow and in a total eclipse the annular ring does not seem very bright. It is easy to look at with the naked eye. In this situation, your pupil also stays open wider and lets much more light enter your eye to be focused on your retina. Unfortunately, this also allows very intense near-infrared light into your eye where it is focused onto your retina. In just 20 to 30 seconds this light can stress out and permanently damage photoreceptor cells, causing them die over the next 24 hours. This leaves permanent blind spots where photoreceptor cells are lost. Because our conscious vision does not perceive the near-infrared light, the full eclipse does not feel uncomfortable to view with the naked eye. Thus, the danger. While you will not feel any pain, this infrared light is quietly damaging your photoreceptor cells.

If you do not have special viewing filters designed to block infra-red light for eclipse viewing, then I can suggest that you should make and use a much safer sun projection viewing box.

Here are some pictures I took while making a viewer from a regular cereal box. This design has been around a long time, and it is also a safe viewer recommended by NASA that I learned about during the last eclipse in our area in 2017. Enjoy.

Safe Solar Eclipse viewer Assembly Instructions

Items required:

1. a cereal box
2. one sheet of white paper
3. aluminum foil
4. sticky tape
5. pencil

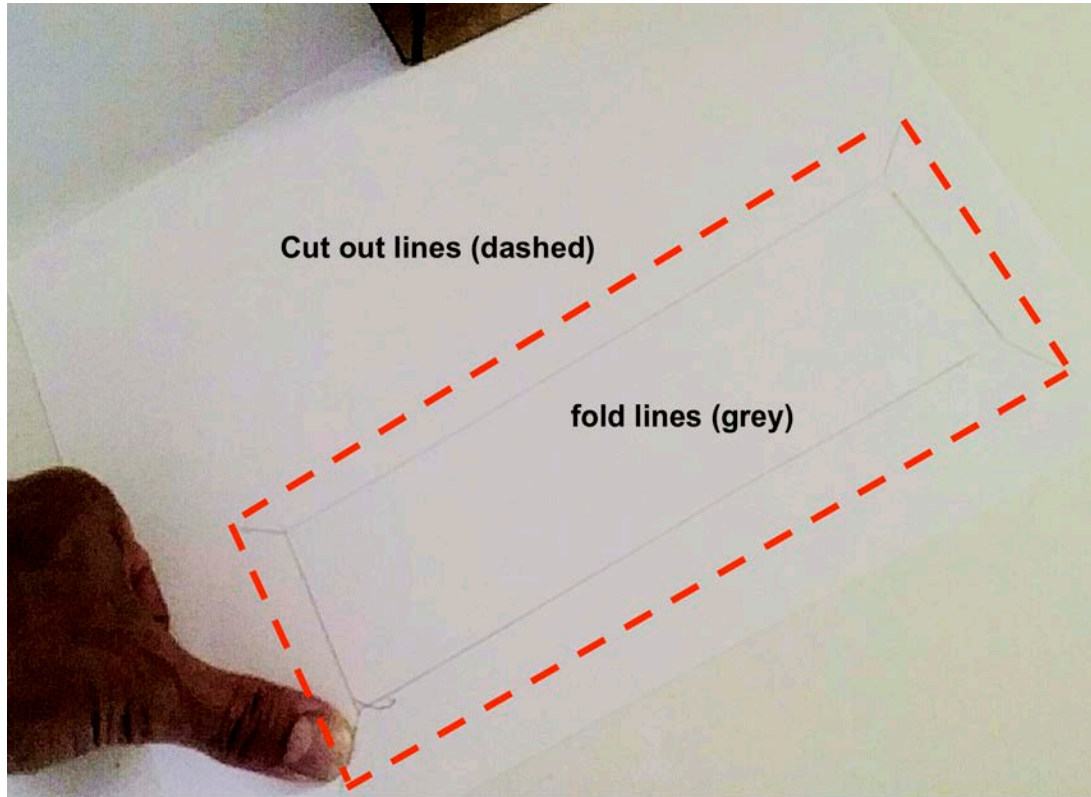
1) Trace the bottom of the cereal box onto a sheet of white paper.





Traced paper for the projection screen.

Add diagonal extensions from each corner about the width of your thumb, then connect the ends of each diagonal with straight lines (along dashed lines). Cut out the rectangle along the dashed lines.



Then cut the diagonals on the white paper. This will make flaps that can be taped to the box.



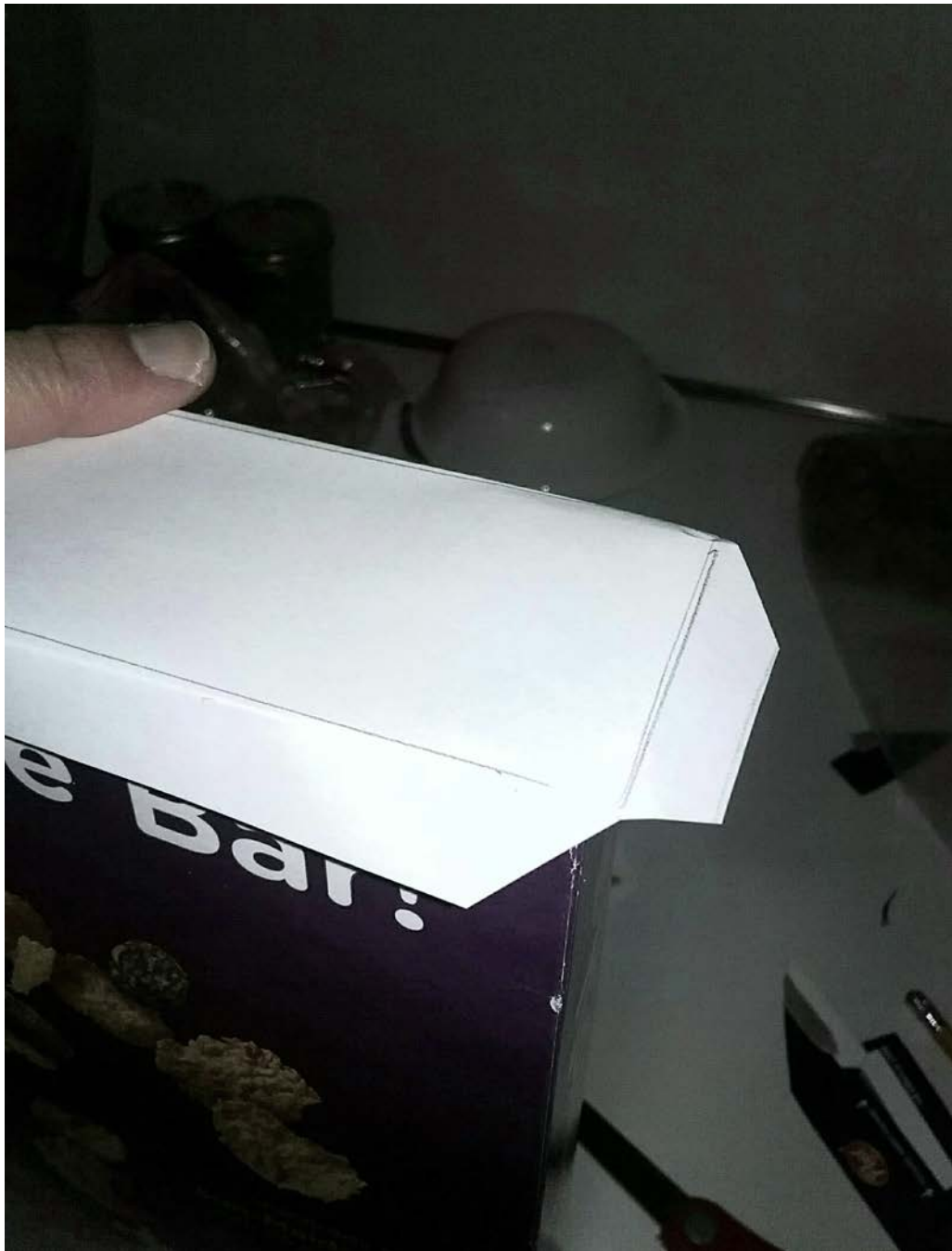
Then cut off the long and short flaps from ONE end of the box.



Snip off the corners of each diagonal so you can fold and bend up flaps on the white paper along all four sides.



These flaps will fit over the end of the box where you can tape them down. This will turn one end of your box into a white projection screen.



At the other end of the box, on one side make a mark on the long flaps, twice the length of the side flap.



At the other end, cut out the long flaps to make an opening that is the length of the side flap



Tape the remaining cardboard of the two long flaps together here for structural support of this end of the box.

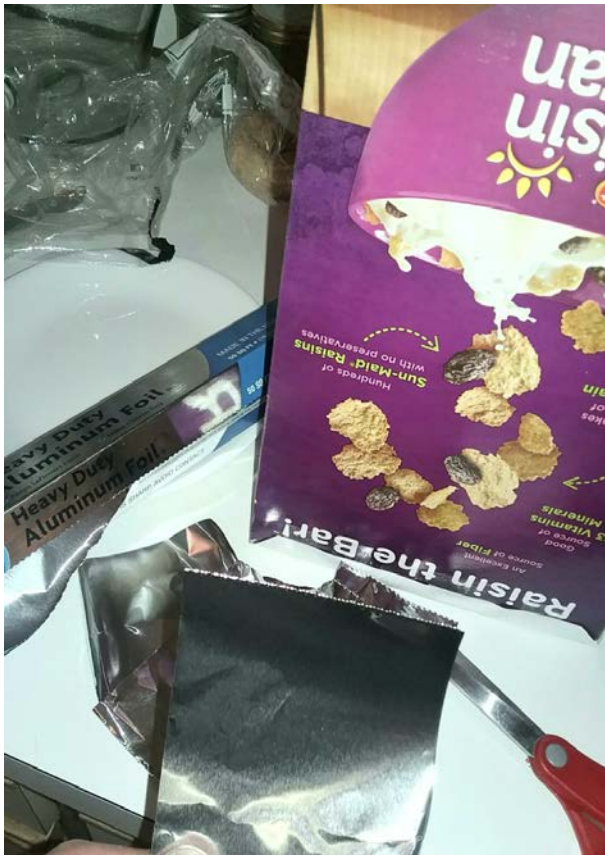
Viewing opening: Close the two long flaps to leave a viewing port for your eye. Leave the side flap in place but cut off its sharp corners. it can be used to shade your viewing eye when using the viewer.



On this side, the larger rectangular opening will be covered with aluminum foil. You can cut off the side flap on this side.



Cut out some aluminum foil, large enough to cover the larger rectangular opening.



Tape the foil over the larger opening.



Make one small pin hole in the middle of the foil. You can use a small nail, pin, or tack.





The white paper is a projection screen that you will view by looking into the box from the other side. This white paper side will be facing downwards, and you will stand with your back to the Eclipse.

To test or use the viewer, hold the box and look in the viewing port (on the right in the picture), with your left eye. If you prefer looking with your right eye, just flip the box over so the viewing port is on left. You may need to tilt the box up and down to get the Sun or Eclipse light to fall on the white paper inside.



Now you have made a classic pin hole projection box. The sun will shine through this hole onto the white view paper screen on the other end of box. Use the small hole with flap to view inside. Remember to stand with the Sun, or eclipsed Sun, behind you as you look in the box.

Built for you by

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