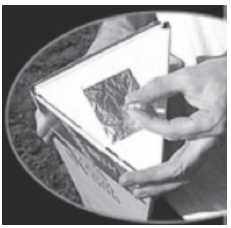
A STEM in the Park Take Home Activity

STEM in the PARK™

Science, Technology, Engineering, and Mathematics



Observe The Sun With A Pinhole Viewer

Safety First! Looking directly at the Sun can cause serious damage to your eyes. **Never** look directly at the Sun with your naked eye. **Never** look through a telescope or binoculars to view the Sun. Also, **never** directly view the Sun through sunglasses, smoked glass, or Mylar. Make a pinhole viewer to safety observe the Sun.

What You Need

- A long cardboard box or tube about 6 feet long. If you don't have a single long box, you can tape two or more together to make one long box
- Scissors
- Duct tape
- Aluminum foil
- A sharp pin or needle
- A sheet of white paper or card stock
- Sunshine!

What To Do

1. If needed, join several cardboard boxes together with duct tape so that you have one long hollow box. Ideally, your box should be about six feet long.
2. Using scissors, carefully cut a rectangular hole in one end of the long box.
3. Use the scissors to cut a rectangular piece of aluminum foil that is a bit larger than the hole you cut in the box. Keep the foil as flat and taut as possible.

Continued on back

What To Do cont.

4. Use tape to attach the aluminum foil to the box, completely covering the rectangular hole you made in step 2.
5. Using the sharp pin, carefully make a small hole in the center of the aluminum foil.
6. Cut a viewing hole in the **side** of the box towards the opposite end of the box from the pinhole. Attach the sheet of white paper to the inside of the box to act as a screen where your projection of the Sun will appear.
7. **With your back toward the Sun**, place the end of the box with the hole towards the Sun. **Without** looking at the Sun directly or through the pinhole, adjust your position until you see the Sun's image on the paper through the viewing hole. You will see an inverted image of the Sun.

Remember: do not look at the Sun directly or through the pinhole

Observe

What do you see? Can you see any sunspots? Make a sketch of what the Sun looks like and record the date. Use your pinhole viewer to observe the Sun every few days or every week for as long as you can. Does the Sun change over time? Are the same sunspots always visible or do they come and go? Are the sunspots always in the same places in your sketches? Astronomer and physicist Galileo made similar observations and sketches around the year 1611.

Learn

Sunspots are areas of the Sun's surface that are cooler than the main disk of the Sun. The sunspots are typically about 7650°F while the surrounding gas is about 9450°F. An average sized sunspot is as large as the Earth! Can you estimate how many times bigger the Sun is than the Earth, based on your observations?

Investigate

What happens to the image of the Sun if you make the pinhole bigger or smaller? What would happen if you made lots of pinholes? What happens to the image if you make a longer or shorter pinhole viewer, so that the distance between the pinhole and the screen is different?

Pinhole viewer instructions adapted from glasgowsciencecentre.org

This activity was provided by BGSU - Department of Physics & Astronomy