

Safe Solar Viewing

By
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Looking directly at the Sun is harmful to your eyes at any time. The result can be a serious eye injury that can leave permanent blurred vision or blind spots at the center of your view. Fortunately, there are many safe and easy ways to observe our Sun. The simplest safe way is to view the Sun's image projected onto a piece of paper. Poke a small hole in an index card with a pencil point, face it toward the Sun, and hold a second card three or four feet behind in its shadow. The hole will project a small, inverted image of the Sun's disk onto the lower card. Experiment with different size holes. A large hole makes the image bright but fuzzy; a small hole makes it dim but sharp. For a better view, you can reduce the amount of daylight shining on the viewing card by enclosing it in a long box. This lets you use a small pinhole giving a sharp image. Alternately, use a paper towel tube, or carpet tube. Cover one end with aluminum foil, securely attach it, and then poke a nice round hole using a needle. Point that end over your shoulder towards the Sun and let the projected image fall on the card you hold near the opposite end where you can view it. Some people make fancy adaptations of this, using dowels to hold the card. Another way to do pinhole projection can be arranged at a window indoors. Find a room with a Sun-facing window, turn out any lights, and pull the shades and block any other incoming light. Arrange for sunlight to enter through a small hole punched in a card near the top of the window. Set up a white piece of paper across the room to catch the Sun's image. Again, experiment with different size holes to get the best, sharpest view. Of course, don't look through the hole directly at the Sun! Look only at the spot of light that falls on the paper. With optical projection and direct viewing projection with a telescope, you can form a much sharper and bigger sun image by projection through a small refractor telescope. This is best done outdoors to avoid the distorting effect of a windowpane. To aim the instrument safely, look at its shadow on a white card as you swing the tube around. (Don't use your finderscope - make sure it's capped at the front end or completely removed.) When the scope's shadow nears its minimum size, a beam of sunlight will shine out of the eyepiece and fall onto the card. Turn the focus knob and experiment with the card's distance behind the eyepiece until the Sun's disk is sharp and as big as you want. Look for sunspots! Use extreme care when doing this! The projected sunlight is magnified and hot! The telescope tube or parts of it can get very hot. Children should never do this alone. Some people use this projected image to draw and map the sunspots. If you prefer to look directly at the Sun, you can use as a filter a square or rectangular arc-welder's glass of shade 13 or 14, which was NOT readily available from the local welding-supply store. (Don't get a lower-numbered shade; the Sun will be too bright to look at safely.) Alternatively, special, cheap "eclipse glasses" are widely made from safe solar filter materials. These have become popular item at "Eclipse Parties". A solar filter designed to be used with a telescope is also safe for viewing with the otherwise unaided eye. Filters that are not necessarily safe, though sometimes recommended in old books, include smoked glass, stacked sunglasses, crossed polarizing shades, photographic neutral-density filters, or a filter intended to block visible light for infrared photography. While these may greatly dim the Sun's glare, thus appearing to do the job, invisible ultraviolet or infrared radiation may be getting through to damage your eyes. Damage to the eyes is quick, painless and not reversible. Some modern materials that are sometimes recommended but not necessarily safe, and NOT RECOMMENDED include Mylar packaging, and CD's. These products are not consistent in manufacture and therefore not safe to use. The clearest and best views of the Sun are had through a properly filtered telescope. The filter must be secured over the telescope's front to keep most of the Sun's light and heat out of the instrument. Never use a Sun filter made to go at the eye end, where it could crack or melt in the concentrated heat. Many inexpensive telescopes come with this type of filter included. The best thing to do is throw it out! Direct viewing with a telescope and proper solar filter gives the best views of sunspots and the complex details within them, as well as the progress of the

Moon's jagged, mountainous edge making its way across the solar disk during an eclipse. Remember that safety is most important. Never look directly at the Sun without using a safe solar filter. If you don't own a solar filter, consider joining an amateur astronomy club in your community. Many members have solar filters and are willing to let you look through their eyepiece. The Eugene Astronomical Society is a group of amateur astronomers dedicated to observing the sky, learning about the Universe, and sharing that understanding and appreciation of astronomy with students and the general public. What makes the society special is our commitment to sharing the EYEPIECE with the public. We do "star parties"! Membership benefits include a telescope lending program, subscription discounts to astronomical publications, a club newsletter, technical help and advice, opportunities to share experience and knowledge with others, and opportunities to observe the sky with other astronomy enthusiasts.