

## How to Make and Use a Pinhole Camera

### Can Or Box Pinhole Camera

A pinhole camera is a small, light-tight can or box with a black interior and a tiny hole in the center of one end. By using common household materials, you can make a camera that will produce pictures.

#### The Box

When you make a pinhole camera for roll or sheet film, use a small can or box as the camera body. You can use anything that has a tight-fitting top - a clean paint can, a vegetable shortening can, a 2-pound coffee can, a shoebox, or even a cylindrical oatmeal box.

To make the can light-tight, paint the inside with dull black paint or line it with black paper to prevent light reflections. If the can you use has a plastic lid, paint the lid black.

Be sure to paint it inside and out; then before using it, check to make sure no paint has chipped off. Chipped or peeling paint on the lid will allow light to enter the camera and ruin your pictures.

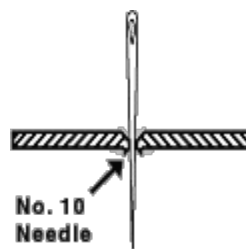


Pinhole camera made from a can.

#### The Pinhole

The film will be attached to the inside of the lid so you will need to make the pinhole in the bottom end of the can. You can make the actual pinhole in the can itself, but it's much easier to make it in a separate piece of heavy black paper or thin metal and fasten this piece over a larger hole cut in the center of the bottom end of the can. Heavy-duty aluminum foil, a piece of aluminum cut from a soda can or the backing paper from Kodak 120 size roll film is good for this purpose.

The distance of the film from the pinhole and the diameter of the pinhole will determine the angle of view and sharpness of your final image. For a camera with the pinhole 3 to 6 inches from the film, you'll get the best results if the pinhole is about 1/75 inch in diameter. You can make a hole this size by pushing a No. 10 sewing needle through the paper or metal to a point halfway up the needle shank. The pinhole should be as circular as possible.



**TIP:** You'll get a smoother hole if you rotate the needle as you push it through. If you're using aluminum foil or paper, sandwich it between two lightweight cards while you make the pinhole. This will help you make a smoother, rounder hole.

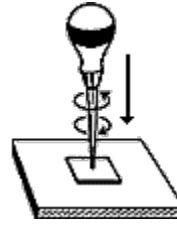
If you are using a piece of aluminum from a soda can, place it on a hard surface and make a small hole in the aluminum with an awl or an ice pick. Don't press too hard—the tip should just barely break through the surface. See illustration. Enlarge and smooth it by pushing a No. 10 needle into it

from the indented side. You can smooth any rough edges with very fine sandpaper.

## Pinhole Awl

You should now make a hole 1/4 inch or more in diameter in the center of the bottom end of the camera body and tape your pinhole in position over the center of the hole.

You can check your pinhole to make sure it's perfectly round by looking through the back of the camera. To see if the image is clearly visible, aim the camera toward a printed page to determine if you can see the letters clearly.



## The Shutter and Viewfinder

The shutter for the camera can be a flap of opaque dark paper hinged with a piece of tape. Use a small piece of tape to hold the shutter closed before and after you take a picture.

A viewfinder for a pinhole camera, while not necessary, can be made of 2 pieces of cardboard or wire. The front frame of the viewfinder should be same shape and slightly smaller than the film and located directly above the pinhole at the front of the camera. The rear frame is a sighting peephole directly above the lid of the can and aligned with the center of the front frame.

When you aim your camera at subjects closer than 5 feet, position the subject low in the viewfinder to allow for parallax--the difference between the view you see through the viewfinder and the image recorded on the film. This effect is caused by the separation between the viewfinder and the pinhole.

## Loading a Can or Box Pinhole Camera

You can load the camera either with film or fast photographic paper. Your choice of film or paper may depend in part on the exposure times. Paper, because it is less sensitive to light than film, will probably require an exposure of about 2 minutes for sunlit subjects. Film may require only 1 or 2 seconds for subjects in sunlight.

Paper is easier to handle since you can load it into the camera under a safelight. If you don't have a safelight, you can work by the light of a flashlight covered with several thicknesses of red cellophane paper placed 6 to 8 feet away. Most film, on the other hand, must be handled in total darkness.

If you use film, you can cut up a roll of KODAK TRI-X Pan Film or KODAK T-MAX 400 Professional Film, 120 size, into 2 3/8-inch squares or 2 3/8 x 3 1/2-inch pieces. This must be done in total darkness, of course. At night a closet will probably be dark enough if lights in adjoining rooms are turned off. Sheet film, such as KODAK Tri-X Pan Professional Film, is easier to use because it's flat.

A camera made from a 2-pound coffee can will take a 2 1/4 x 3 1/4-inch piece of film or

photographic paper. You can use a 3 1/4 x 4 1/4-inch piece if about 1/2 inch is clipped from each corner of the film or paper. A camera made from a 1-gallon paint can will take a 4 x 5-inch piece of film or paper.

When you have the size of paper or film you need, tape it firmly to the inside of the end of your camera opposite the pinhole. The emulsion should face the pinhole. The emulsion side of photographic paper is the shiny side. The emulsion on roll film is on the inside of the curl. Sheet film is identified by notches cut into one of the shorter sides. When you hold the film in a vertical position with the notches in the top edge toward the right side, the emulsion is facing you. Another way to determine the emulsion side of either paper or film is to touch both sides with a moistened finger. The emulsion side will feel slightly tacky. Test near the edge to avoid a fingerprint in the center of the picture. You will need to tape down the four corners if you use cut-up roll film or paper. Taping two diagonal corners will work for sheet film. Close the camera, making sure the shutter is closed.

It's a good idea to practice with an exposed piece of film or paper before trying to load the camera for your actual picture taking.

## Exposure

To get clear, sharp pictures, your camera must remain very still while the shutter is open. Use plenty of tape or a lump of modeling clay to hold your camera still. Lift the black paper to uncover the pinhole and keep the pinhole uncovered for the recommended time. Cover the pinhole with the black paper between exposures.

The following table gives approximate exposure recommendations for a pinhole camera. It's a good idea to make three exposures of different durations for each scene to improve the likelihood you'll get a good picture.

<b>KODAK Film</b>	<b>Bright Sun</b>	<b>Cloudy Bright</b>
TRI-X Pan, T-MAX 400, or ROYAL Pan Film 4141 (ESTAR Thick Base)	1 or 2 seconds	4 to 8 seconds
T-MAX 100 Film	2 to 4 seconds	8 to 16 seconds

## Processing and Printing

Process and print film negatives in the usual way. Dry the paper negative and make a contact print from it in the normal way, with the emulsion (picture) side of the paper negative toward the emulsion (shiny) side of the printing paper.

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