Pin (Hole) Oak
The shorter the focal length, the more of a wide-angle look the photo will have. Extremely short focal lengths can yield interesting results.

Pinhole

Extreme depth of field

The Idea

Experiment with pinhole photography by going back to basics and photographing without a lens. Pinhole photography opens up a new world of possibilities. What makes a pinhole photo different? The depth of field is extreme. All parts of the image—near to far—are in focus. However, depending on factors such as the size of the hole, there is often a soft, ethereal quality to the photos. The longer exposures required can show movement, and the characteristic heavy vignetting often gives magical results. No other camera can achieve quite the same effect. Pinhole cameras can be as basic as a cereal box with a hole poked in it or as high-tech as a digital SLR with a pinhole body cap in place of a lens. Pinhole photography is fun. Try it and see for yourself.

The Ingredients

- Pinhole camera or pinhole body cap for SLR
- Tripod or beanbag (optional)
- Cable or remote release (optional)
- Your imagination (required)

The Process

There are many options for anyone interested in getting started—the variety of pinhole cameras is incredible. Just about any enclosed space can be made into a pinhole camera: a hollowed-out pumpkin, a matchbox, an airplane hangar—even a cupped hand. These, and even crazier ideas, have been successful. You can convert a lens camera into a pinhole model or buy a ready-made pinhole camera; you can even make or buy a pinhole body cap for use on an SLR camera—film or digital.

Exposure

To determine the exposure time, you need to take a number of factors into consideration: the pinhole diameter, the focal length (the distance from the pinhole to the film or sensor), the speed of the film or the ISO setting of the camera, and the shooting conditions. Exposure times can vary dramatically depending on this last variable. The homemade pinhole camera I use most (working with ISO 100 film) requires a 1-second exposure in bright sun, a 9-second exposure on an overcast day, and an exposure of around 100 seconds indoors.

To estimate the exposure times required for your pinhole camera, you first need to determine its f-stop. The f-stop of a pinhole camera equals the focal length divided by the pinhole diameter. For my homemade pinhole camera, for example, the focal length (distance from the pinhole to the film) is 21mm and the diameter of the pinhole is 0.2mm, so the f-stop is f/105 (21 ÷ 0.2 = 105).

Formulas and exposure calculators to help you figure out the times for your specific pinhole camera are available online, but here are a couple of examples.

f/105 (my homemade pinhole camera)

	ISO 100	ISO 400
Bright sun	1 sec	< 1 sec
Overcast	9 sec	2 sec
Dawn/Dusk	21 sec	4 sec
Indoors	97 sec	17 sec

f/235 (Zero Image 6 × 9 pinhole camera)

	ISO 100	ISO 400
Bright sun	4 sec	< 1 sec
Overcast	66 sec	12 sec
Dawn/Dusk	157 sec	28 sec
Indoors	729 sec	128 sec

It's a good idea to tape an exposure chart to the back of your camera for easy reference. Also, keep track of your exposures the first few times you use your pinhole camera; this will help you to fine-tune your exposures. It is easier than you might think. Negative film is very forgiving, and if you use a pinhole body cap on a digital SLR camera, you'll be able to see your results and make adjustments immediately.

Accessories

Not much light gets through a tiny pinhole, so exposure times are usually very long. This means you'll probably need a tripod or some other means of securing your camera.

You can simply set the camera on the ground or a table, or you can set it on a beanbag to make positioning easier. How about tape? I've used duct tape to secure my pinhole camera to various objects. If you do use a tripod, make sure it can handle the weight of your camera. Another useful accessory is a level. Try gluing a small line level to the top of your camera. Because most pinhole cameras don't have viewfinders, it can be difficult to get straight horizons in your images without one.

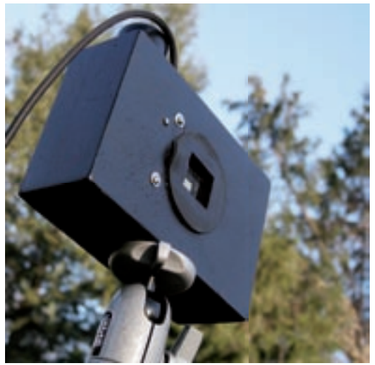
A light source is also a good tool for pinhole photography. This can be a camera flash or even just a flashlight. It isn't only pinhole photography that gives you the opportunity to paint with light—any long-exposure situation gives you the chance to use flash or other types of lighting to manipulate the exposure. The process is simple: during exposure, fire a flash or shine a light on a part of the subject. This can serve to add light to an area that would otherwise be underexposed, or it can serve as a creative tool to draw attention to a specific part of the image.

Capturing motion

Whether it's the subject moving, the camera moving, or both, pinhole photography is a great way to highlight motion. The long exposures of pinhole photography will enable you to show moving stars, moving water, or the effect of wind on things such as flags or fields of wheat. Set up your camera next to a road to capture the lights of passing cars.

Another fun technique is to move the camera during exposure. Secure your camera to something like a bicycle or a baseball bat, for example. Be sure to get part of the object in your camera's field of view, then begin the exposure and slowly move the object. The result will be an object in sharp focus with a completely blurred background. Give it a try. Experiment.

Moving objects can also be eliminated from a scene through long exposures. One photographer set up her pinhole camera, using extremely long exposures, at New York intersections. Busy all day with cars and people, they look empty in the photos; only the roads and buildings show because no person or car was in one place long enough to show up on the image.

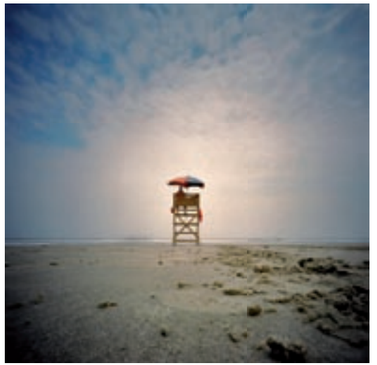


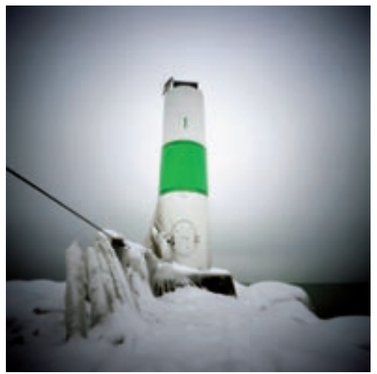
Composition

Owing to the heavy vignetting of pinhole photography, centering the subject can often have dramatic effects. Also, try getting close—very close. The incredible depth of field allows this, and the results can be interesting.

And don't be afraid to shoot into the sun or other light sources. The tiny pinhole diffracts light, creating interesting patterns. To line up backlit shots, look to see how the shadows fall on the face of your camera. Lining up the pinhole with the edge of a shadow will result in the light source peaking out from the subject.

← **Left:**
A close-up of my homemade pinhole camera, made from wood, brass, and a variety of screws and other parts found around the house.





← **Clockwise from top left:**
Veering Left
I taped the pinhole camera to the side of my bike using duct tape, and exposed for about five seconds while slowly walking the bike in a semicircle. The horizontal white streak is the sun.

At the Beach
A pinhole camera is perfect for the beach because sand, sun, and surf won't hurt it—much.

Pinhole Pier
Because of the tiny aperture, pinhole photographs have tremendous depth of field.

Lighthouse One
Pinhole photography often results in heavy vignetting, so centering the subject can have dramatic effects.

Extras

Much has been written about the history of the camera obscura and the art of pinhole photography. Put simply, a camera obscura is an enclosed space such as a box, with a hole in one side to let light in. Light enters the hole, and an inverse image of the scene outside projects on the surface opposite the hole. Generally, the smaller the hole, the sharper the image. This is the basic principle behind pinhole photography. Film or a camera sensor is positioned opposite the hole to capture the projected image.

← **Facing page, clockwise from top left:**

Seagull
This image of a seagull in Wildwood Crest, New Jersey, is one of the first pinhole images I ever shot. I used a plastic Holga that I had converted.

Warp Speed
The colorful streaks are the result of heavy diffraction.

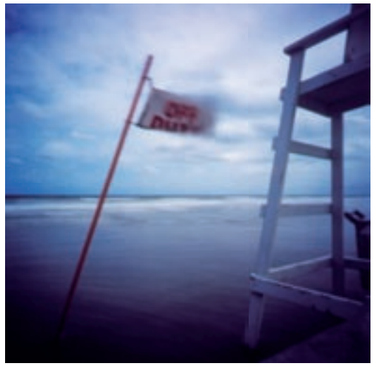
On the Road
You don't always need a tripod. I placed my camera on the ground in the middle of the road for this shot.

Sun Screen
When you're using a pinhole camera, try shooting into the sun.

Liquid Light
Light filtered through the trees and into my camera. The angle of the sun created a little diffraction, which gives this underwater look.

For a similar effect ...

Can you get pinhole images without a pinhole camera? No. Nothing can take the place of a pinhole camera. But you can achieve somewhat similar effects using a regular SLR or DSLR with a lens. Try closing down the aperture as far as it will go (to something like f/22 or f/32). This will give you a bit of the light diffraction that is common with pinhole photography. It will also give you extreme depth of field and require long exposures. Use a low ISO setting and a neutral density filter to further increase the exposure time. This technique won't result in pinhole images, but the look will be similar. Add a little vignetting with your image-editing program to complete the effect.



← **Far left:**
Appalachia
Many pinhole images, like this one taken in West Virginia, have a soft, diffuse quality.

← **Left:**
Off Duty
Another example of a pinhole photo showing motion. Myrtle Beach, South Carolina.

↙ **Below left:**
Lifeguard Chair
Not all pinhole images are soft—they can have sharp detail.