

Activity Instructions

Part I - Constructing an Aluminum Can Pinhole Camera

The following items will be needed for this part of the activity:

- aluminum can
- craft knife
- clear packing tape
- duct tape
- scissors
- black bristol board
- black electrical tape
- sewing needle
- fine sandpaper or nail file
- photographic paper
- scanner

Step 1

Rinse out the aluminum can so that the inside is not sticky.

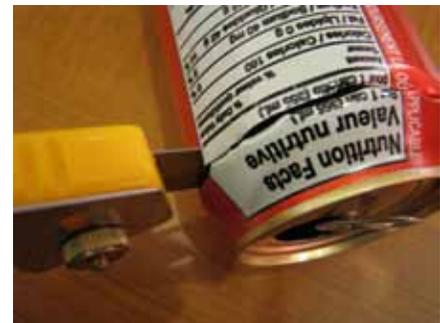


Figure 1

Step 2

With a craft knife, cut off the top inch (or just below the neck) of the aluminum can (**Figure 1**).



Figure 3

Step 3

Carefully wipe out any water that is inside of the can (**Figure 2**).



Figure 2

Step 4

Cover the sharp edge of the can with tape to prevent cuts (**Figure 3**).

Step 5

Cut a rectangle out of black bristol board. The dimensions should be approximately 10 cm by 22 cm (**Figure 4**).

Step 6

Tape the bristol board in a cylinder around the can so that it is tight, but loose enough to slide the can in and out fairly easily.

Step 7

Use the bristol board cylinder to trace a circle onto the black bristol board and then cut it out (**Figure 5**).

Step 8

Cut notches 2 cm deep at regular intervals on one side of the cylinder and fold them inwards (**Figure 6**).



Figure 6

Step 9

Tape the circle on top of the notched cylinder with black electrical tape to seal the edges and prevent light from getting in.

Step 10

Halfway down the can, carefully poke a hole through the aluminum can with the sewing needle or another thin and sharp object. Make sure not to dent the aluminum can. The smaller the pinhole is, the sharper the image will be (**Figure 7**).



Figure 4



Figure 5



Figure 7

Step 11

Thoroughly sand down the edges around the inside of the pinhole with the fine sandpaper or the nail file so that the can is flat and smooth. This allows the ray of light to travel through the hole without any obstacles (**Figure 8**).



Figure 8

Step 12

If brightly coloured tape is available, tape around the pinhole to highlight its location (**Figure 9**).

Step 13

Using a craft knife, cut a hole in the black cylinder the same distance as the pinhole is from the top of the can. When the can is covered with the black cylinder, the two holes should be level (**Figure 10**).



Figure 9



Figure 10

Step 14

Using clear tape, tape all around the black cylinder (except for the hole) to make it waterproof (Figures 11 and 12).

Step 15

Find a darkroom that has a red light or turn off all the lights in a regular room. The photographic paper is ruined for most purposes if a non-red light hits it. However, for solargraphy, a small amount of light can hit it as the light of the sun will be much stronger.



Figure 11



Figure 12

Step 16

Take a 5 in. x 7 in. piece of photographic paper and trim it to 3 1/2 in. x 7 in. Insert it into the can, ensuring that the emulsion side is oriented towards the pinhole. The pinhole must not be covered up (Figure 13). If the film canister pinhole camera is also being constructed, save the remaining 1 1/2 in. x 7 in. strip of paper.



Figure 14

Step 17

Cover the can with the black cylinder and tape the pinhole with black electrical tape so that the paper on the inside is not exposed to light until the camera is attached outside (Figure 14).



Figure 13

Step 18

Find a roof, a high window, a balcony or any appropriate location to attach the pinhole camera so that it can capture the movement of the sun across the sky. Securely tape the camera using duct tape as the wind may alter the position of the camera, causing blurry photos. Point the camera south, in the direction of the sun (**Figure 15**).

Step 19

Open up the pinhole, leaving the tape on the can so that the pinhole can be covered again later.



Figure 15

Step 20

Leave the camera outside for several days or up to half a year. After a few days, a few paths of the sun will be exposed onto the photographic paper. If left for a few months, the colours will be much brighter and there will be more sun tracks.

Step 21

When the allotted time has passed, replace the piece of tape over the pinhole and take down the camera.

Step 22

In a dim or dark room, take out the photographic paper and scan it in a scanner.

Step 23

When the photograph has been scanned, invert the colours and flip the photo horizontally, resulting in the mirror image of the exposed photograph (see sample photographs at the end of this document).

Part II - Constructing a Film Canister Pinhole Camera

The following items will be needed for this part of the activity:

- black film canister
- craft knife
- aluminum can or industrial strength aluminum foil
- sewing needle
- packing tape
- fine sandpaper or nail file
- photographic paper
- scanner



Figure 16

Step 1

Using a craft knife, cut a 1/2 cm by 1/2 cm hole into the side of a black film canister (**Figure 16**).



Figure 17

Step 2

Cut a square of approximately 1 cm x 1 cm off of either an aluminum can or industrial strength aluminum foil. Regular aluminum foil can be used, but the industrial strength aluminum foil is preferable.

Step 3

Smooth the foil out with a fingernail to remove any creases. Carefully poke a small hole through the foil or aluminum square with a sewing needle or another sharp, thin object. The smaller the pinhole is, the sharper the image (**Figure 17**).

Step 4

Thoroughly sand down the edges around the hole with fine sandpaper or a nail file to allow the ray of light to travel through the hole without any obstacles.

Step 5

Tape the aluminum with the pinhole to the inside of the black film canister so that the pinhole matches up with the hole in the canister (**Figure 18**).

Step 6

Find a darkroom that has a red light or turn off all the lights in a regular room. The photographic paper is ruined for most purposes if a non-red light hits it. However, for solargraphy, a small amount of light can hit it as the light of the sun will be much stronger.

Step 7

If using 5 in. x 7 in. photographic paper, cut off the top 1 1/2 in. and then cut a 3 in. strip, resulting in a piece of paper roughly 1 1/2 in. x 3 in. (**Figure 19**). If doing both the aluminum can pinhole camera and the film canister pinhole camera, the same sheet of photographic paper can be used. Insert it inside the can, making sure that the emulsion side is oriented towards the pinhole. Carefully check that the paper is not covering up the pinhole on the inside (**Figure 20**).



Figure 18

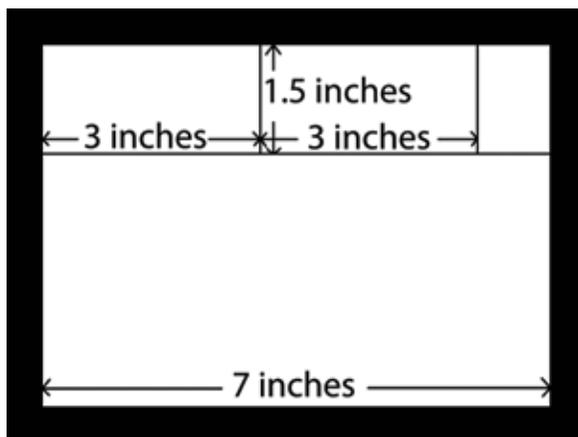


Figure 19



Figure 20

Step 8

Replace the lid of the canister and tape it closed with black electrical tape. Cover up the pinhole with black electrical tape so that the photographic paper inside is not exposed until it is attached outside (**Figure 21**).

Step 9

Find a roof, a high window, a balcony or any appropriate location where the pinhole camera can be attached so that it can capture the movement of the sun across the sky. Point the camera south and securely duct tape the camera so that it faces the direction of the sun (**Figure 22**).



Figure 21

Step 10

Open up the pinhole, leaving the tape on the canister so that the pinhole can be covered again later.

Step 11

Leave the camera outside for several days or up to half a year. After a few days, there will be a few paths of the sun exposed onto the photographic paper. If left for a few months, the colours will be much brighter and there will be more sun tracks.



Figure 22

Step 12

When the allotted time has passed, replace the piece of tape over the pinhole and take down the camera.

Step 13

In a dim or dark room, take out the photographic paper and scan it using a scanner.

Step 14

When the photograph is scanned, invert the colours and flip the photo vertically (if the scanned image is upside down), or horizontally (if the scanned image is right-side up) so that the mirror image of the exposed photograph is visible (see sample photographs at the end of this document).

Sample Solargraphs

An example of what a film canister solargraph looks like, straight out of the canister (**Figure 23**).



Figure 23

Opened: Friday afternoon
Closed: Monday morning

Figure 24 shows the photograph flipped and with the colours inverted. In **figure 25**, the colours have been adjusted.



Figure 24



Figure 25

To adjust the colours using Adobe Photos, select Image -> Adjustments -> Auto Levels
then Image -> Adjustments -> Auto Contrast
then Image -> Adjustments -> Auto Colours

Levels, Contrast and Colours can be adjusted manually if desired.