Camera obscura or pinhole camera

Build your own camera obscura and discover how it works.

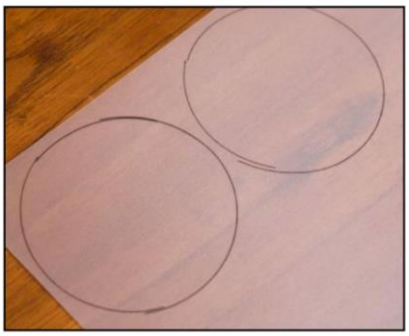
Material

- Empty Pringles can
- Ruler
- Marker pen
- Drawing pin
- Utility knife
- Adhesive tape
- Aluminium foil / black duct tape
- Tracing paper
- Scissors

Steps

1) Clean the inside of the Pringles can. Use a marker pen to draw a line about seven cm from the bottom of the can. Cut the can in half following this line.

2) Take the smaller part and make a round pinhole in the middle of the bottom.



3) Cover the top of the smaller part with tracing paper.

4) Attach both parts firmly together using the black duct tape so that the tracing paper is fastened in the middle.

5) As little light as possible should penetrate the pinhole camera. Cover gaps letting light through with black duct tape. Leave an opening at the top so you can look into the camera.

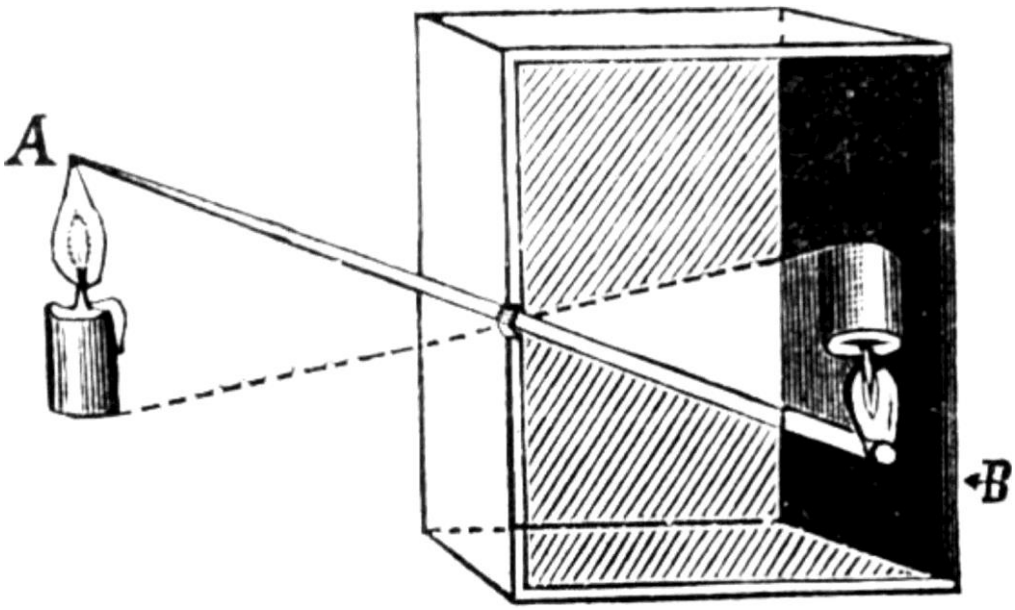
6) Now go to a light location. Close one eye and look through the opening with your other eye. Cover the space between your eye and the camera with your hand as the inside of the camera should be as dark as possible.

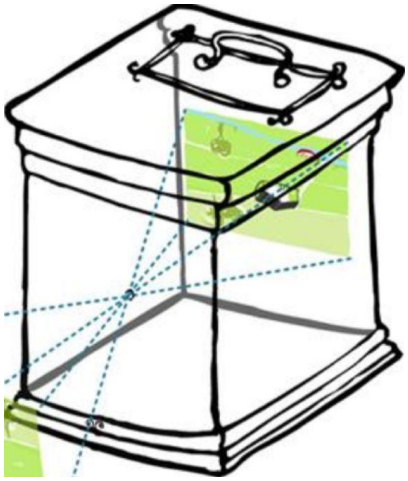
You will see a reversed and inverted image (left to right and upside down). The same principle applies to image formation in the eye.

Does image formation in the eye correspond to image formation in the camera obscura? To answer this question, we need to look at how the camera obscura works.

How does a camera obscura work?

Camera obscura means "dark room" in Latin. As the name suggests, it is a darkened chamber with a small hole in one of the walls. You can compare it to a black box with a tiny hole.





Light waves enter through this hole and hit the surface opposite the hole. This way, an image is projected onto the opposite surface, which acts as a screen.

Point A appears on the screen as light spot B.

The hole should not be too small, as it would not allow enough light in and create a dark image. Determining the size of the hole is a matter of balancing the sharpness of the image and the intensity of the light.

Thus a reversed and inverted image of the outside world is created. If the camera obscura has a translucent screen (e.g. made from frosted glass), you can see the image from the outside.
A camera obscura can be as large as a room in which you can stand.

During the Renaissance, painters used the camera obscura as a tool to transfer reality accurately onto the canvas. You can even turn your room into a camera obscura!