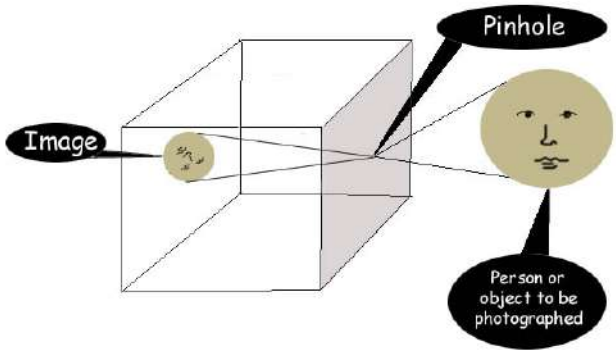
CAMERA OBSCURA

Since the time of Aristotle, people have known that rays of light passing through a pinhole forms an image. Alhazen, a 10th century Arabian scholar, described the effect in detail and told how to view an eclipse of the sun in a camera obscura, a darkened room with a pinhole opening to the outside. Camera obscura means, literally, "dark chamber." Many artists used the camera obscura, even before the invention of photography, as an aid in drawing something realistically.



Drawing developed by Carla Dominice Baker

In a camera obscura, the object is projected upside down on the wall that catches it (see drawing, above). This is because light rays from the top of the head travel in a diagonal line through the pinhole to make the bottom of the image on the back wall of the camera and so on. Film (developed centuries after the principles of the camera obscura were discovered) captures the image. Lenses and light meters let us do much more with the camera--such as adjust and sharpen the focus and determine just how much light will hit the film and how long it will expose the film.

MAKING A CAMERA OBSCURA

(1) A camera obscura that you can sit or stand in

A simple camera obscura can be made from a large box (e.g., an appliance box).

A hole of about 1" diameter needs to be made on one side.

A way for a person to get into the camera should be devised: a door, or through the bottom. Make sure that the door can close.

The trick is to let light in only through the pinhole--else the inside of the camera will not be dark enough to see the image. Covering the box with a blanket will help keep out extraneous light rays. The camera obscura at Davis works best if it is used with two blankets: one that covers all but the pinhole side and a folded one on the ground that the camera sits on top of, so that light rays don't get in from where it touches the ground and where we get in.

Put a piece of white paper opposite the pinhole. This paper can be changed with each student so that they can draw what they see while inside the box. It's fun to draw a friend.

(2) A small camera obscura

Students can make their own small camera obscura using a small box and a magnifying glass. The glass bends the rays and makes them meet (or focus) on tracing paper to form an image. The process is as follows:

Materials:

a small plastic magnifying glass

a small box

poster board

tracing paper

electrician's tape

strong glue

acrylic or poster paints (including black)

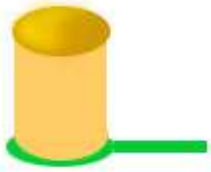
scissors, pencil, paintbrush,ruler, exacto knife, saucer, jar of water

Process:

Paint the inside of the box black and let it dry

Cut a large rectangle out of one side of the box (e.g. 2 1/2-3" high by 4" long), opposite where you will put the lens

Cut out a 4" x 8" rectangle of poster board. Roll and tape it into a tube that is the diameter of the magnifying glass



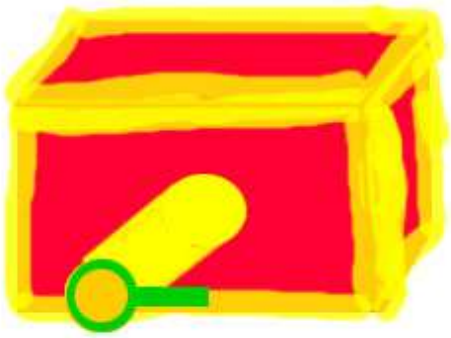
Hold the tube on the side of the box that is opposite the large rectangular hole and trace around it with a pencil. Cut out the circle.

Measure and cut a piece of tracing paper to fit over the rectangular hole in the box. Tape the tracing paper over the hole.

Tape the magnifying glass to one end of the tube

Slide the end of the tube without the magnifying glass on it into the circular hole in the box

Tape around all the edges of the box to prevent light from getting in (don't tape the tube to the box though)



Using the camera obscura:

Point the magnifying glass toward an object that is in bright light. You will see it, upside down, through the tracing paper on the back of the camera. Push the tube in or out of the box to focus it. The magnifying glass acts as a lens; this image should be much sharper than the one created by the large camera obscura described above.

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