

Teaching Tip

Safe cutting surfaces will be needed for cutting the holes in the box and frame. Since each box will be a different size, students will need to measure the inside of the box carefully to make sure their frame fits. Remind them to check their measurements before cutting the frame. A bright scene viewed from a darker room will be easiest for students to see in their cameras. Turn down the lights in the room and have them look out a window on a bright day.

How to...

Build a Camera Obscura

Building a simple camera obscura with a pinhole lens will help you to understand how basic cameras work and the relationship between the lens and focal length.

You will need:

- a cardboard box with a removable lid, like a shoebox
- a craft knife
- a paper punch
- Scotch tape
- black card stock or other heavy paper, 3 x 3 inches (8 x 8 cm)
- tag board, approximately the size of one end of the box
- tracing paper
- a ruler

Review the information on the camera obscura and the pinhole camera on pages 6 and 9.



Fig. 1-25.

- 1 Cut an opening centered in one end of the box, approximately 2 x 2 inches (5 x 5 cm).
- 2 Cut an opening at the opposite end of the box, also centered, approximately 2 x 3 inches (5 x 8 cm).
- 3 With a paper punch, make a hole in the center of the black card stock. Tape the card stock inside the box, covering the 2 x 2-inch (5 x 5 cm) hole, as shown on the right.
- 4 Measure the inside of the box. Trim the tag board to fit into the box parallel to one of the short ends.
- 5 Make a frame from the tag board to hold the tracing paper. Start off using the ruler to mark a half-inch border around the tag board. On a protected surface, use the craft knife to cut a window inside the border.
- 6 Tape the tracing paper to one side of the frame.



Fig. 1-26.

- 7 Lightly tape the tracing paper frame to the center of the box. Close the lid and, pointing the camera toward a light source, look through the open end of the box at whatever objects are in the scene. You can also go outside and use sunlight as your light source.

- 8 Open the box and move the frame closer to the pinhole. Close the lid and observe the scene again. Do objects in it appear larger or smaller? Are they in sharper focus or more blurred?
- 9 Now move the frame farther from the pinhole. How has the image changed? Continue to experiment with moving the frame to find the best focus for the image. Observe the way that objects look projected onto the tracing paper as you change the frame's position.



Fig. 1-27.

Art History

Edward Weston kept a set of journals throughout his life, which he called his Daybooks. He wrote about his life and photography, the people he knew, and his travels. His Daybooks were a record of his life as a photographer. Ansel Adams used a different kind of journal. He recommended that photographers write down the location, time of day, weather conditions, film, camera, lens, f-stop, and shutter speed for each photograph. His idea was to know what you did, so you know what works.



Fig. 1-28. **Completed camera obscura.**