



CAMERA OBSCURA

Foam Board Pinhole Camera



Developed with
Brian Magnuson, Texas
Grades 9-12

Time: 12-14 days



OBJECTIVES

Students will...

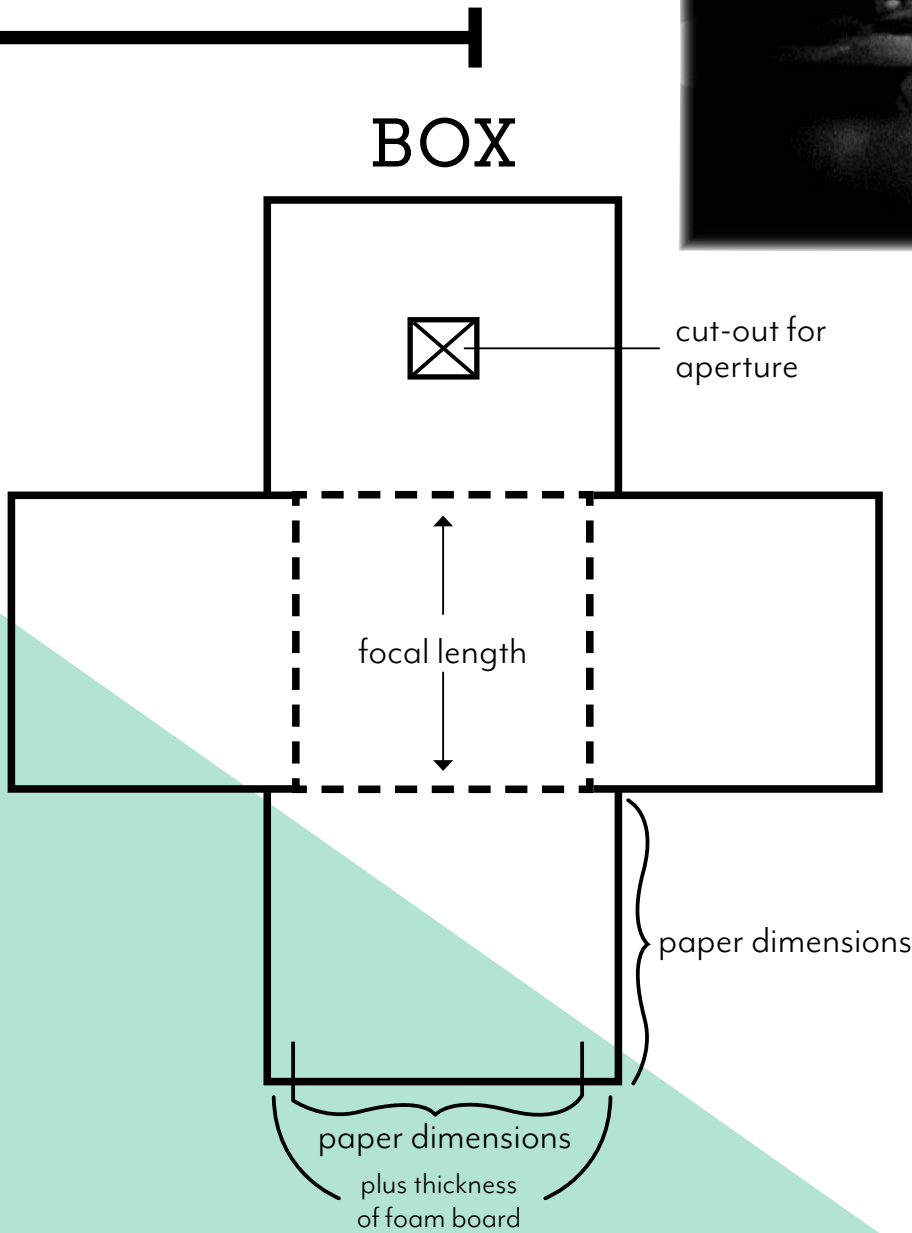
- Build a pinhole camera from scratch
- Learn the history and uses of optic machines in art
- Learn how light and optics work
- Learn to see a composition
- See how perspective works in nature and how to render it in art

KNOWLEDGE & SKILLS

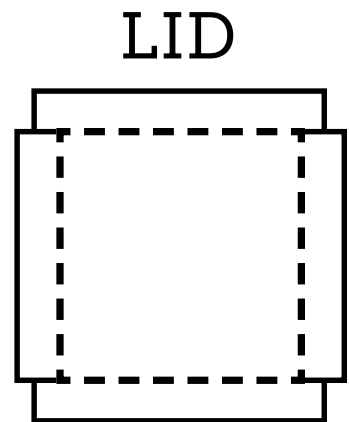
1. Perception. The student develops and organizes ideas from the environment.
 - A. Illustrate ideas for artworks from direct observation.
2. Creative expression/performance. The student expresses ideas through original artworks, using a variety of media with appropriate skill.
 - A. Create artworks based on direct observations, personal experience, and imagination.
 - B. Demonstrate effective use of art media and tools in drawings and photography.
3. Historical/cultural heritage. The student demonstrates an understanding of art history and culture as records of human achievement.
 - A. Analyze selected artworks to determine cultural contexts.
4. Response/evaluation. The student makes informed judgments about personal artworks and the artworks of others.
 - A. Analyze original artworks.

INTRODUCTION

If the room allows, build it into a camera obscura. If there is a window, block it in with cardboard, heavy black paper, or whatever you can find that will block out the light. In one area, cut out a hole so light can pass through. Then place a painted or black-taped CD over the hole, or whatever else you may want to use, as an aperture. Use the room-sized camera obscura to demonstrate what happens in the camera body. Discuss the history of optics in art from Renaissance to today's cameras and scanners as tools in art.



--- score line
— cut line



INSTRUCTIONS

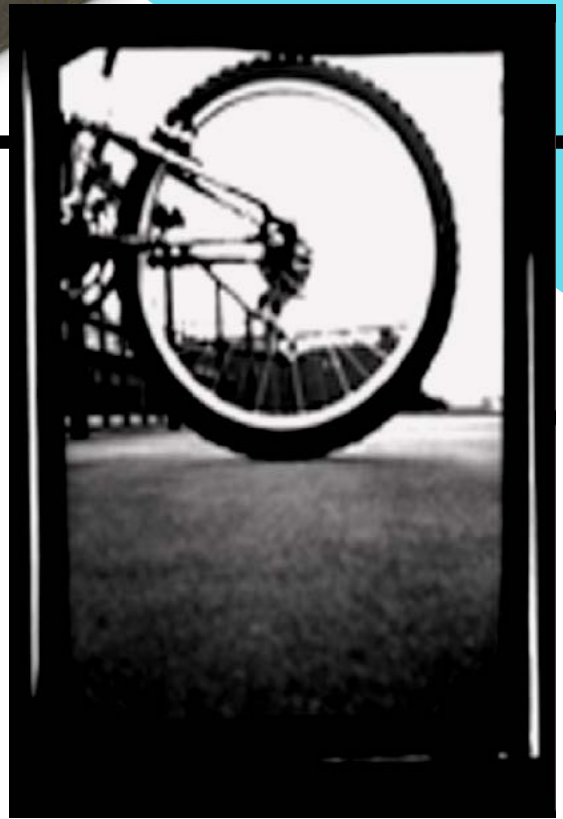
Demonstrate how to make the pinhole camera, and give different examples of how to make the body. Distribute the supplies and have students spend 1-2 days measuring and laying out the camera on foam board. This illustration is for a rectangular box, but the camera can take on a variety of shapes and sizes.

1. Cut out and score the body as show in the illustration. Fold on the scored lines.
2. Cut a hole in one side of the body for the aperture as shown in the illustration.
3. Have students tape joints with black duct tape or other black tape that blocks out light.
4. Make lid in the same fashion as the body. Be sure to measure the body accurately for the lid's dimensions.

5. Cut a piece of aluminum into a square big enough to cover the hole cut out of one side of the camera body. Drill a small pinhole in the center of the aluminum. Sand hole smooth with fine-grit sandpaper. Make sure the hole is a pinhole. You can always make it larger if exposure is too long.
6. Tape the aluminum over the center of the cutout on the camera body.
7. Place a piece of duct tape over the pinhole as your shutter.
8. Have students spend 1-2 days decorating their cameras.



9. Place the cameras on a light table or window, and look into it to see if any light is coming through. Test to see if lid is tight on body.
10. Test the cameras for light leaks by taking them in a darkroom, placing a piece of photo paper in back of the cameras, and taking them outside. DO NOT open or remove the tape.
11. Develop the paper. If it is white, the camera is good to go. If it is black, the camera is leaking too much light. Go back and make sure the lid fits and that there are no corners leaking.
12. When the camera is light tight, place another piece of photo paper in the back, close the lid, and take outside to get a picture. Open the shutter (tape) for 8 seconds or so then place the tape back over the hole.
13. Develop the photo paper and see how the picture looks. If it's too light, add more time to exposure. If it's too dark, do a shorter exposure. Typical exposure in full sun is 8-15 seconds depending on focal length. Longer cameras require longer exposures.



ADVANCED, ADAPTATIONS & MODIFICATIONS

- Advanced: Students may try double exposure. Students may also experiment with different cameras, like oatmeal cans etc.
- Adaptations: Material used to create cameras can be changed; however, the assessment criteria remains the same.
- Modifications: Material used to create the cameras can be changed to an alternate material that is easier to manipulate, such as an oatmeal can, coffee tin, or anything that can be made light tight. Assessment criteria are modified according to the ability of the student.

ASSESSMENT

- Daily grade – working on cameras
- Major grade – completed camera and successful photo
 1. Correctly measured lines to create camera.
 2. Light tight camera.
 3. Creative design on outside of camera body.
 4. Correct exposure.
 5. Interesting composition.



X-ACTO



MATERIALS

- X-ACTO™ knives — 9701147, blades — 1100589
- Nasco No. 2 Pencils — 9727070, pkg. of 144 or 9728094, pkg. of 12
- Foam board, black on black, 20" x 30" x $\frac{3}{16}$ " — 9715347
- Duct tape, black — 9729294(B)
- Sandpaper, fine-grit — 9714789(A)
- Self-healing pads — 9728320
- Yardstick, 36" — 9704372

The following should be brought in by students (*) or purchased from a photography supplier:

- Developer
- Fixer
- Water
- Photo paper
- CD (*)
- Aluminum can (*)

RESOURCES

- Renner, Eric. Pinhole Photography. Woburn, MA: Focal Press, 2000
- Student photos
- Teacher examples
- Room-sized camera obscura

VOCABULARY

- | | |
|-------------------|-------------|
| Camera obscura | Composition |
| Value | Perspective |
| Negative/Positive | Proportion |
| Rule of Thirds | |

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