JAM Sessions

Capturing Light: Pinhole Camera

Summary

Have you ever walked along a nature trail and stopped to take photos? With cell phones being so common, many of us have the ability to grab our phones and snap a quick photo, but have you ever wondered how a camera works? The word *photography* literally translates to “light drawing”. It’s actually a technique for recording images with light that dates back thousands of years to the Ancient Greeks and Ancient Chinese.

Craft

Using a device called a *camera obscura*, someone would view an image projected through a small hole onto the floor. This is the first version of what would eventually be called a camera. Today, you will learn how to make your own!

Materials

- Small to shoebox-sized box with lids/flaps
- Black construction paper
- Tape or glue
- Thumbtack
- Tracing paper or parchment paper
- Light source, such as a candle
- Scissors
- Ruler
- Pencil
Instructions

1. Select a box that is not damaged in any way and can close completely. (The lid or all flaps must be included and intact.)

2. Glue black construction paper all around the inside of the box.

3. Tape any areas on the outside of the box where light can get through. This seals the box completely from outside lighting!

4. On one end of the box, use a thumbtack to prick a tiny hole in the center. To get it perfectly centered, use the ruler and pencil to trace an “X” spanning the end of the box, and poke the hole in the center of the X.

5. On the other end of the box, cut a rectangular hole. Approximately three inches wide by two inches high should be good.

6. Cut a piece of tracing paper that is just a bit bigger than the rectangle you cut in the box, and attach it over the hole with tape or glue.

Demonstration

Use the following instructions to use your pinhole camera:

1. Go to as dark of a room as you can. If you have a small candle, flashlight, or other light source, bring it with you.

2. Place the camera in front of you with the pinhole end facing the light source, and look through the rectangle. What do you see?

Explanation

What’s going on here?

You just made a pinhole camera! The earliest form of anything we would call a camera was called a camera obscura, a simple device with a small hole on one end of a dark box-shaped
object, or even a room, that would allow light to pass through a small hole and project an image on the other side. What may look odd about the image is that it looks upside down! Why is that?

All objects, unless they are perfectly black, reflect at least some light. It’s easiest to see when an object is illuminated, such as a flashlight, candle, or other small but bright light source. The light rays from the top of the light source actually angle down when the light passes through the hole. The light rays from the bottom of the source angle upwards when its light passes through the hole. This causes the entire image to appear upside down! Lenses and prisms were later added to cameras to make images appear right side up, just as our eyes see them.

Vocabulary

Photography - Literally “light drawing”, it is the art and science of capturing and processing an image.

Camera obscura - darkened box or room that allows an image to project through a small hole onto a surface

Light - An illuminating energy that stimulates eyesight, allowing us to see an image

Projection - The presentation of an image on a surface