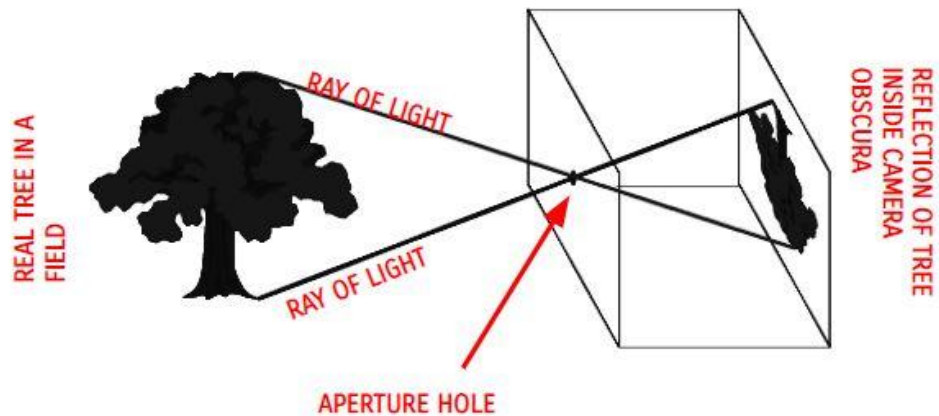


CHALLENGE 1: DIY Camera Obscura

Camera Obscura

Camera obscuras were the first step to inventing the camera that we know and love today. Light bounces off the subject and gets filtered through the hole of your camera obscura. When you look through you will see an upside down image.



MATERIALS

- A paper towel roll
- Scissors
- aluminum foil
- wax paper
- regular tape and duct tape
- small pin

EXAMPLES



STEPS

Vocab

- **Camera Obscura** - "a dark room."
 - The first version of a camera

Create:

- Step 1: take your paper towel roll and cut off about 2 inches from the roll
- Step 2: on the longer roll cover one end with wax paper. Make sure the wax paper is as flat as possible, then tape down.
- Step 3: Reattach the short roll to the long roll on top of the wax paper. Use duct tape to make sure no light will get through.
- Step 4: Lay aluminum foil over the short end closest to the wax paper with the shiny side facing down. Try to get the foil as flat as possible and tape down.
- Step 5: Use a tack or pin to make a small hole in the center of the foil
- Step 6: Decorate with fancy paper or markers
- Step 7: Explore by looking through your new Camera Obscura!

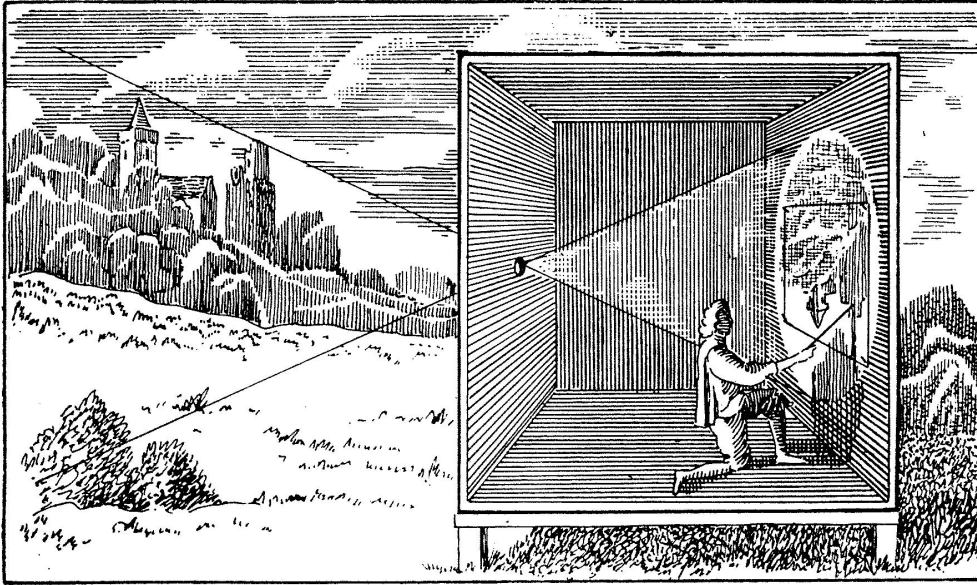
Tips

- Try making the hole a little bigger, this will allow more light to enter, but the larger the hole to more blurry your image will look
- Go outside! The more light you have the easier you will be able to see the image inside your camera obscura
- Look at something with a lot of contrast, like a tree against a bright blue sky

SHARE

Upload your photos and tag MOPA on Instagram @MOPASD

The Camera Obscura



WHAT IS IT?

- ◆ an ancient optical tool (dating back to 500-300 BCE) that went on to be used by painters and astronomers
- ◆ led to development of the camera and *photography!*

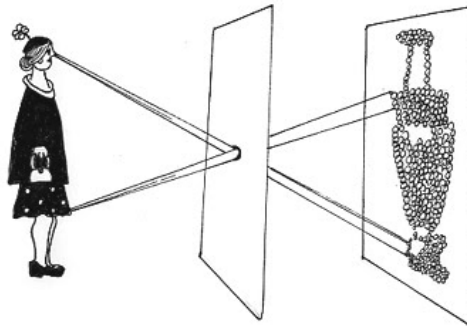
HOW DOES IT WORK?

1

All objects reflect light

Light enters the hole at an angle

Light rays *reflect* from the top of the object going down, and from the bottom of object going up



3

In the camera obscura we see an upside-down image of whatever is outside

(this is the reflected light!)

DID YOU KNOW...?



Your **eye** receives images just like the *camera obscura*: through a small opening and upside down! **But**, the brain automatically flips the image so you see things right-side up.

This is how a **camera** works too! A mirror inside of a film camera flips the image for us to see through the viewfinder. In a digital camera, the software does the same thing.

ADJUSTING APERTURE

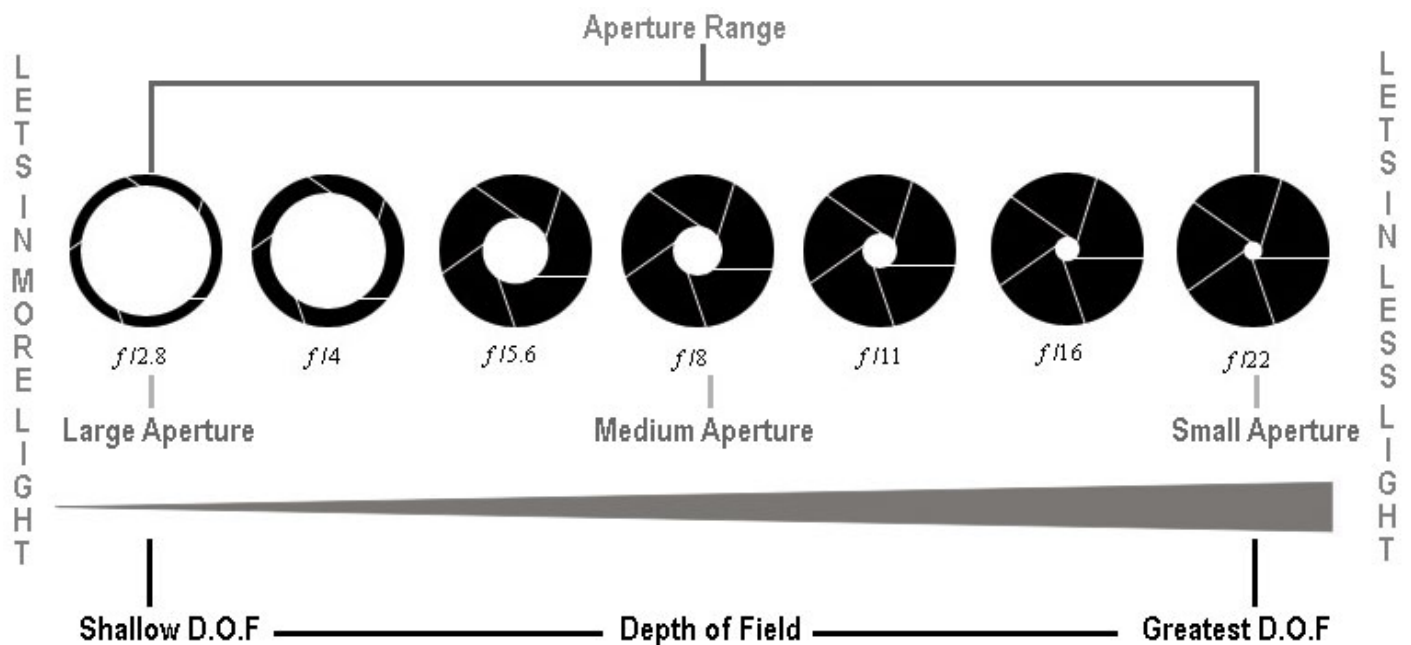
- Adjusting the opening where the light comes in (i.e. the **aperture** in the camera) affects the image that we see!

What happens when the aperture (opening) is small?

- Less light comes in → darker image
- Light comes in through a small hole so it doesn't scatter → more of the image is sharp (this is called **depth of field**)

What happens when the aperture (opening) is big?

- more light comes in → brighter image
- Light scatters as it comes in → only part of the image is in focus (**shallow depth of field**)



MAKING PHOTOGRAPHS!

- ◆ You can create a photograph inside a *camera obscura* by placing a photosensitive material on the place where the image is being projected! (this is how film cameras work)

BEYOND: What does a lens do?— a lens focuses the light coming in, depending on your distance from the object; some lenses take in more light than others.