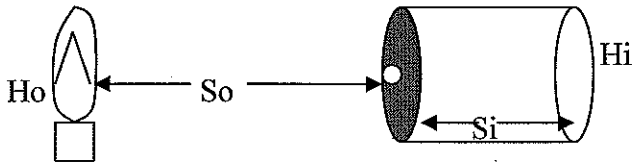


PINHOLE CAMERA LAB

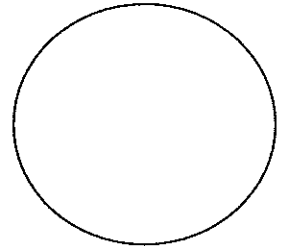


H_o = object height
 H_i = image height
 S_o = object distance
 S_i = image distance

Purpose: To determine how a pinhole camera forms images and to discover the relation between the image and the size of the pinhole, the size of the can, and the distance from the object.

Procedures:

1. Place duct tape over the LARGE HOLE in the can!
2. Predict what you will see on the screen of the coffee can when the large hole is covered. Draw your prediction in the circle to the right:
3. Now check your prediction and describe your results.



4. Draw the path of light from the top of the filament, through the pinhole, to the screen. Now, draw another ray of light from the bottom of the filament through the hole to the screen.
5. Explain why the image is inverted.

6. Is the image also reversed right to left? Design a procedure to find out! Explain your procedure and results here:

7. Predict how moving the lamp away from the can will change the size, shape and brightness of the image on the screen.

8. Move the can closer and further from the lamp and notice how the size of the image changes on the screen. Describe your observations.

9. All of your observations have been made while using the pinhole. Predict how the image would be Different if you had used the LARGE OPENING (nail hole):

10. PREDICT how the image from the NAIL HOLE would be similar:

11. Now remove the tape from the LARGE OPENING and record your results:

12. Place the tape back on the large opening and UNPLUG THE BULB.

Measure the height of the object (H_o). $H_o = \underline{\hspace{2cm}} \text{ cm}$

Measure the length of the can (S_i) $S_i = \underline{\hspace{2cm}} \text{ cm}$

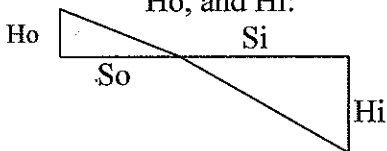
13. Plug the bulb in and measure the values of S_i , H_o , and H_i for the S_o values below:

$S_o = 10 \text{ cm}$ $S_i = \underline{\hspace{2cm}} \text{ cm}$ $H_o = \underline{\hspace{2cm}} \text{ cm}$ $H_i = \underline{\hspace{2cm}} \text{ cm}$

$S_o = 25 \text{ cm}$ $S_i = \underline{\hspace{2cm}} \text{ cm}$ $H_o = \underline{\hspace{2cm}} \text{ cm}$ $H_i = \underline{\hspace{2cm}} \text{ cm}$

$S_o = 50 \text{ cm}$ $S_i = \underline{\hspace{2cm}} \text{ cm}$ $H_o = \underline{\hspace{2cm}} \text{ cm}$ $H_i = \underline{\hspace{2cm}} \text{ cm}$

14. Use your data and your understanding of geometry to show the equation between the values of S_o , S_i , H_o , and H_i :



15. Your eye is similar to a pinhole camera. Would you expect the images on your retina in your eye to be inverted (upside down)? Explain.

16. The distance from the pinhole in your eye to the retina is about 2.5 cm. How big would the image be in your eye for a 1.8 m tall person when the person is standing 3.0 m from you?