

Name: _____ Date: _____ Period: B

Overview

This is the data collection portion of the lab. In this section, you will be collecting data and making observations about how images are altered by convex lenses and concave mirrors.

Objectives

Students will observe the manners in which light is altered by convex lenses and concave mirrors and will collect data to allow later analysis of the lenses and mirrors (they will calculate focal lengths of the lenses and mirrors). Students will be able to compare and contrast observations to pre-lab hypotheses with the intention that they will be curious to learn the explanations in lecture following the lab.

Hypothesis

The hypotheses for this lab were done as a pre-lab exercise due earlier.

Equipment

Each group (two to three students) will need the following:

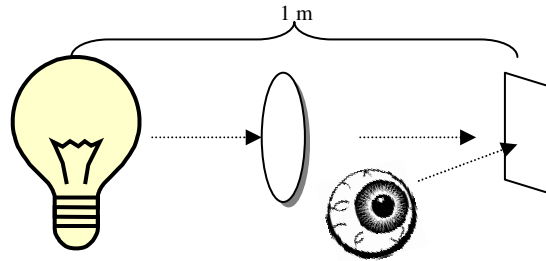
- 1 meter stick and meter stick stands
- 1 convex lens and lens stand
- 1 concave mirror and mirror stand
- 1 light source (light bulb: there will be a selection of them)
- 1 screen (a box or box top will do)

Procedures

You may do either the lens first (next page), or the mirror first (beginning page 4). Regardless of the order, you must do both the lens and the mirror.

Light and a Convex Lens

- 1) Set up the apparatus as shown in the diagram. The distance between the light bulb and the screen should be approximately 1 meter, and the lens should be placed, initially, about half way between the light and the screen.
- 2) Move the lens toward the screen until an image is clearly visible on the screen.
- 3) Make observations of the image on the screen. *Sketch and describe* what you see.



<u>Sketch</u>	<u>Description</u>

- 4) Measure the distance between the light bulb and the lens (measure to the middle of the lens, that is, half way through the fat part of the lens). Measurements should be to the nearest 1 mm. Record this distance.
- 5) Measure the distance between the lens and the screen. Again, measure from the middle of the lens, and measure to the nearest 1 mm. Record this distance.
- 6) Move the lens toward the light until another image is clearly visible on the screen.
- 7) Make observations of the image you now see: Give a brief description and compare/contrast this with the image you saw earlier in step 3).

First Lens Image Measurements:	
4) Bulb – lens distance:	
5) Lens – screen distance:	

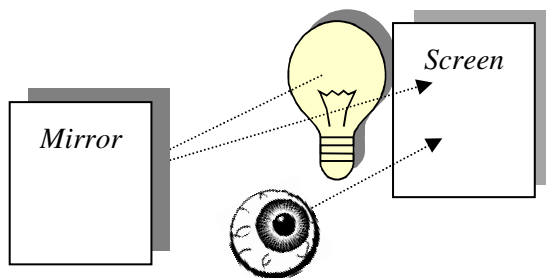
- 8) Measure the distance between the light bulb and the lens (measure to the middle of the lens, that is, half way through the fat part of the lens). Measurements should be to the nearest 1 mm. Record this distance.
- 9) Measure the distance between the lens and the screen. Again, measure from the middle of the lens, and measure to the nearest 1 mm. Record this distance.
- 10) Place an opaque barrier (like a piece of cardboard or a thick card) over the top half of the lens and secure it with a paper clip or clothes pin. Observe what happens to the image on the screen. Write your observations here.

Second Lens Image Measurements:	
4) Bulb – lens distance:	
9) Lens – screen distance:	

- 11) What do you see if you place your hand or some other object behind the light bulb?

Light and a Concave Mirror

- 1) Set up the apparatus as shown in the diagram. The light bulb should be placed flush with the screen. Initially, the mirror should be about 50-70 cm away from the screen and bulb.
- 2) Move the mirror until an image is clearly visible on the screen.
- 3) Make observations of the image on the screen. *Sketch and describe* what you see.



<u>Sketch</u>	<u>Description</u>

- 4) Measure the distance between the light bulb and the mirror (measure to the middle of the mirror). Measurements should be to the nearest 1 mm. Record this distance.
- 5) Measure the distance between the mirror and the screen. Again, measure from the middle of the mirror, and measure to the nearest 1 mm. Record this distance.
- 6) Place an opaque barrier (like a piece of cardboard or a thick card) over the top half of the lens. Secure the barrier with a clothes pin or paperclip. Observe what happens to the image on the screen. Write your observations here.

First Mirror Image Measurements:	
4) Bulb – mirror:	
5) Mirror – screen distance:	