Exploring Curved Mirrors Lab

Teacher's Guide

Topic:

Reflection and Mirrors

The following information is provided to the student:

Question:
How does the orientation and relative size of an image change as the object is moved from a position close to a concave mirror (and a convex mirror) to a position very far away?

Purpose:
To describe the changes in the relative image size and image orientation which are observed as a person moves from a position very close to a curved mirror (both concave and convex) to a position very far away.

A complete lab write-up includes a Title, a Purpose, a Data section (with organized observations for the two types of mirrors), and a Conclusion/Discussion. The Conclusion/Discussion section should include a discussion of the manner in which the relative image size and orientation change as the object moves from a nearby position to a distant position. The discussion should include both types of curved mirrors.

Materials Required:

Two large demonstration mirrors - concave and convex..

Description of Procedure:

Two demonstration mirrors are placed in separate parts of the room; one is labeled concave and the other is labeled convex. A student stands directly in front of a mirror - a couple of inches away. While gazing at the image the entire time, the student slowly walks backward away from the mirror for a distance of five to ten meters. Special attention is given to the changes which occur to the relative size of the image (magnified, reduced) and the orientation of the image (upright, inverted). Observations are recorded in the Data section. The process is repeated for the other mirror.

Alternative Materials and Procedure:

This lab could be done with the front and the back side of a spoon being used as a concave and a convex mirror. Smaller mirrors could also be used.

Safety Concern:

There is always a higher than usual level of risk associated with working in a science lab. Teachers should be aware of this and take the necessary precautions to insure that the working environment is as safe as possible. Student *horseplay* and off-task behaviors should not be tolerated.

Suggestions, Precautions, Notes:

1. Clear a pathway for students to walk away from each of the two mirrors without the interference from desks, chairs or other objects.

2. This is a good opportunity to introduce some vocabulary - "upright", "inverted", "magnified", and "reduced." Encourage students to use this vocabulary in their observations and their Conclusion/Discussion.

Auxiliary Materials:

None

Scoring Rubric:

RM8.	**Exploring Curved Mirrors Lab**	**Score**
____	Included, labeled and organized all parts of the lab report.	
____	Data section included observations of how the image appeared for various object locations for both types of mirrors. Observations are organized, accurate, clear and thorough.	____/____
____	Conclusion uses sentences to describe the changes in the relative size and orientation of the image as an object moves from very close to a concave mirror to a more distant location. Description is accurate.	

Connections to The Physics Classroom Tutorial:

The following reading is a suitable accompaniment to this lab:

http://www.physicsclassroom.com/Class/refln/u13l3e.cfm

http://www.physicsclassroom.com/Class/refln/u13l4c.cfm

Connections to Minds on Physics Internet Modules:

Sublevels 6 and 9 of the Reflection and Mirrors module are suitable accompaniments to this lab:

http://www.physicsclassroom.com/mop/module.cfm