ACTIVITIES

Student Activities *continued*

Finally, they should bend the mirror into a concave shape and observe the strength and direction of the reflection.

7 Have students hypothesize about what this experiment suggests about how funhouse mirrors work.

8 Students should then participate in on-line research to check accuracy of hypothesis, and to look for current-day uses of this information.

(Less-advanced students may need for the teacher to offer a few suggested examples of technology, and simply identify what part of this information each uses.)

TEACHERS GUIDE

LASER OPTICAL DISC SET

ITEM # 5133-00

LIGHT AND COLOR - DEMONSTRATION DEVICES

- How do those mirrors in fun houses work?
- Why do items located from the surface of a pool seem to have moved when we try to grasp them?
- How do we manipulate light to achieve a desired result?

Students will explore refraction, and reflection to understand how light commonly occurs and is commonly used in our daily lives.
The kit comes complete with a Laser Ray Box that emits 1, 3, or 5 parallel beams and that is powered by an AC adapter, 8 optic components, a magnetic activity mat with printed scales and angles, a laser light beam chart, and a foam-lined, impact-resistant, carry all case.

Materials

- Geometric Optics Demonstration Kit (Laser Optical Disc Set)
- Internet access
- Shape Chart/Handout

Goals & Objectives

Students will:

- define the terms: ray, beam, convex, concave, diverge, converge, light waves.
- learn about geometric shapes.
- observe and discover how light is transferred through different shapes.

Assessment

1. Advanced student Assessment: student discussion will indicate readiness for finish of the lesson. Students should compose a paragraph explaining how light rays affect what we see, and how technology uses light rays today.

   Note: Depending on class time, lab may take 2- 3 days.

2. Traditional students Assessment: students should be given an answer sheet to express answers, measurements and other observations of each step.

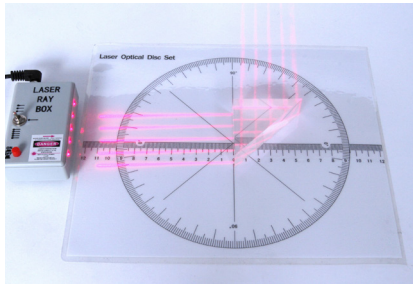
   The lab will take longer, perhaps a week.

Activities

1. Let students examine shapes in the kit, naming each geometric shape, and measuring each angle.

2. Define the terms: ray, beam, convex, concave, diverge, converge, light waves.

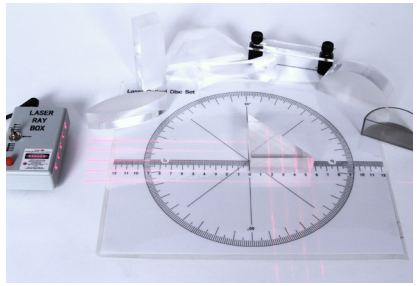
3. Together, observe what happens to a light beam when it is shown through various shapes.



4. Have students imagine the shape represents a pool of water, and the beam of light is the sun.
   Observe what happens to the light beam as it passes through the shape (water.)
   a. Does the light appear to stay in a straight line from its source, or does it appear to jump to another spot?
   b. With multiple beams, does the shape cause light to converge or diverge?
   c. How could this explain that objects aren't where they look like they are underwater?

5. Select a shape that is similar to the shape found in a fun-house mirror. Using the shape chart on the attached Student Handout, they will shine the beams through the shape and observe how the light "bends". They will notate what angles the light creates.

6. Place the mirror in front of the light beams and observe the strength and direction of the reflection.



Then they should bend the mirror into a convex shape and observe the direction of the reflection.

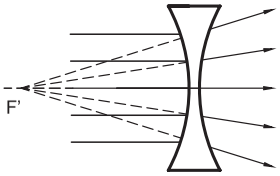
Note

It is always best to DO an experiment ahead of time to be able to best present it to the class.

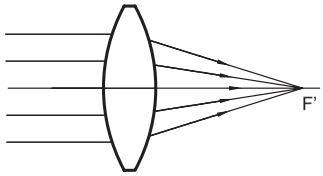
continued on page 4

STUDENT HANDOUT

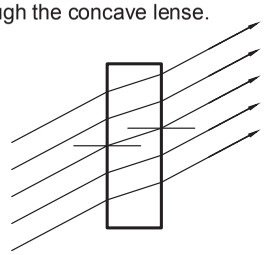
Shape Chart



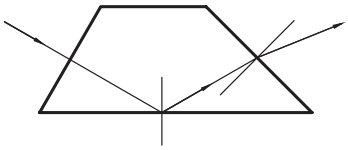
1. Concave Lens
Five light beams passing through the concave lense.



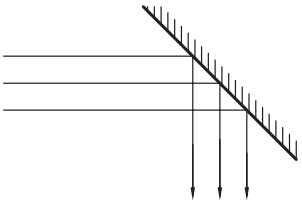
2. Convex Lens
Example of five light beams passing through the convex lense.



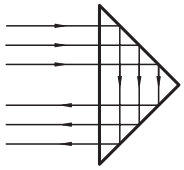
3. Parallel Bar
Five light beams passing through the parallel bar.



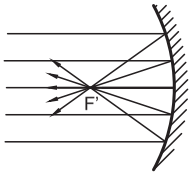
4. Trapezoid Prism
Example of one light beam passes through the trapezoid prism.



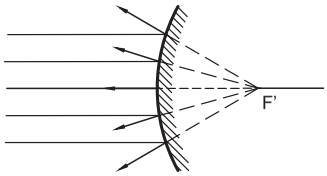
5. Mirror
Three light beams reflecting off the mirror at 90°.



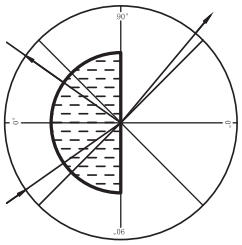
6. Right Angle Lens/Prism
Three light beams passing through the right angle lens and their reflection.



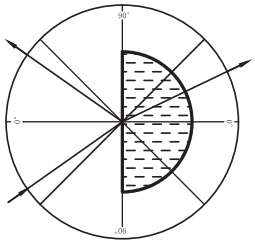
7. Concave Mirror
Example of three light beams reflecting off the concave mirror.



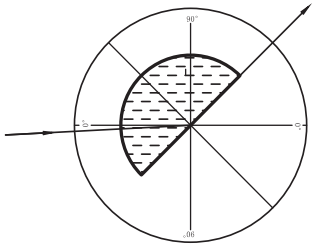
8. Convex Mirror
Example of three light beams reflecting off the convex mirror.



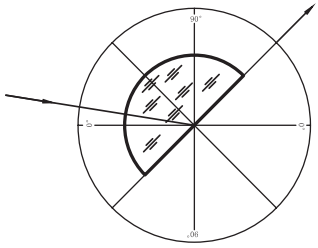
9. Semi-Circle Prism
The light beam passing through theinterface to refract and reflect. Light turns from dense to sparse.



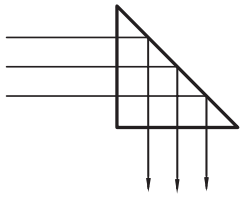
10. Semi-Circle Prism
The light beam passing through theinterface to refract and reflect. Light turns from sparse to dense.



11. Semi-Circle Prism
Total Reflection demonstration and mensuration for critical angle. Water as medium.



12. Hollow Prism
Total Reflection demonstration and mensuration for critical angle. Glass as medium.



13. Right Angle Lens/Prism
The light beams pass through the lense and demonstrate the phenomenon of total reflection.

14. Possible Assembly of multiple optical components.