Name _____ Date _____

Regents Physics Lab #29R

Period _____ Mrs. Nadworny

Partner(s): Due Date _____

NO Lab Write-Up Required

Reflection of Light

Purpose

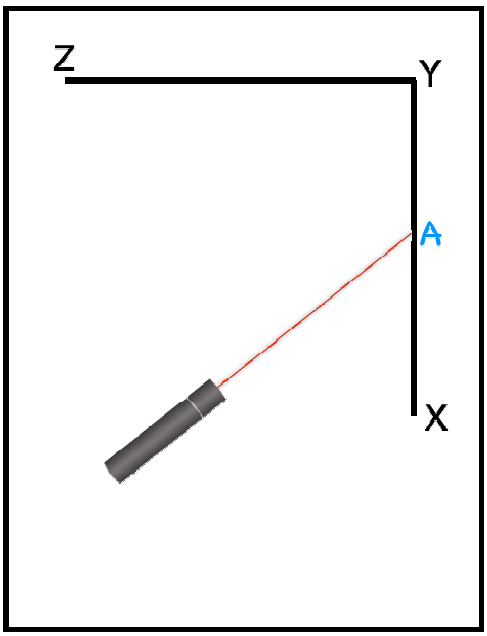
- To investigate the properties of a plane mirror.

Materials

- 2 Plane mirrors
- 2 Mirror Supports
- Protractor
- Ruler
- Laser pointer
- PENCIL
- Cardboard
- 6 Pins

Procedure

1. Detach the last page of this lab and place it on top of a large piece of cardboard.
2. Support a plane mirror on its side by inserting it into a stand. Place the mirror on the paper so that the silvered surface points towards the left and coincides with the line XY. Use a small piece of tape to hold it in place.
3. Repeat the step above but this time by placing a second mirror supported on line YZ and facing toward the bottom of the page.
4. Slide your paper and cardboard to the edge of the table so that they just barely overhang.



5. Hold your laser pointer so that it is parallel to the table and at the same level as the paper. Direct your laser beam towards the first mirror. If your laser is being held at the appropriate height, you should see a beam extend from your laser to the first mirror and so on.
6. Have your partner assist in placing TWO pins along each of your incident and two reflecting rays.
7. Remove the mirrors from lines XYZ. Use a pencil and ruler to redraw your laser beams by using the pins as your guide.
8. Repeat steps 1 – 8 on your partner's paper. Once everyone in the group has their beams drawn, they may clean up all of their materials except for their protractor and pencil.

SAFETY CAUTION – never point a laser at someone's eyes no matter how low the power of the laser!

9. Label the points where the reflected rays hit your mirror (along line XYZ) as A and B. (See diagram on first page for help.)

10. At point A draw a dotted line extending to the left and perpendicular from mirror line XY. This line is called the normal line.

11. Now, measure the angle between the incoming ray and your normal line. This angle is called your incident angle. Record your data in the table below.

12. Measure the angle between the rebounding ray and the same normal line. This angle is called your reflected angle. Record your data in the table below.

13. Calculate the difference between the two angles.

14. Repeat steps 10 – 13 for point B on mirror line YZ with the normal line extending downward.

15. Attach your diagram to this lab. (40 pts)

Data Collection (25 pts)

Incident Ray	Incident Angle (deg)	Reflected Angle (deg)	Difference in Angles (deg)
A			
B			

Post-Lab Questions Answer the following questions in the space below. Show all work!

1. Based on the results of your lab, what can your determine about a light beam's incident angle and reflected angle from a plane mirror? Explain. (5 pts)

_____

_____

_____

_____

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2. Does the ray leaving the setup exit approximately parallel to, perpendicular to, or at another angle from the ray entering the setup? Explain. (5 pts)

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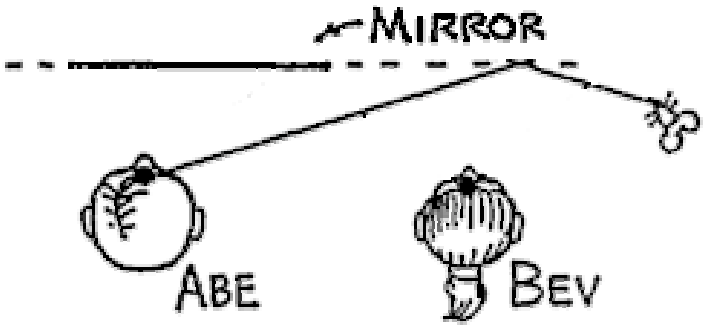
3. Identify a possible source of error. State what the error was. Explain how it occurred. Explain how it affected your data/diagram (angles). Explain how it affected your final result (difference in angles). Be specific regarding whether it was too large, too small, too close, too far away, etc.) (5 pts)

_____
_____
_____
_____
_____
_____

Abe and Bev both look in a plane mirror directly in front of Abe (left). Abe can see himself while Bev cannot see herself - but can Abe see Bev, and can Bev see Abe? To find the answer we construct a ray diagram. If a light ray drawn from Abe to Bev with $\theta_i = \theta_r$ meets the mirror, then they can see each other.



4. Can Abe see the mouse? Explain. (5 pts)

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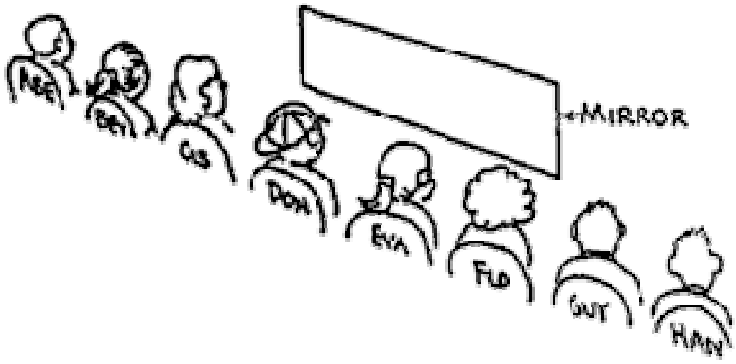
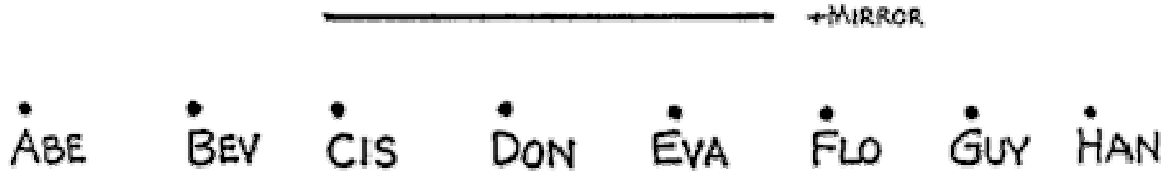
Refer to the following information for the next three questions. (15 pts)

Here we have eight students in front of a small plane mirror.



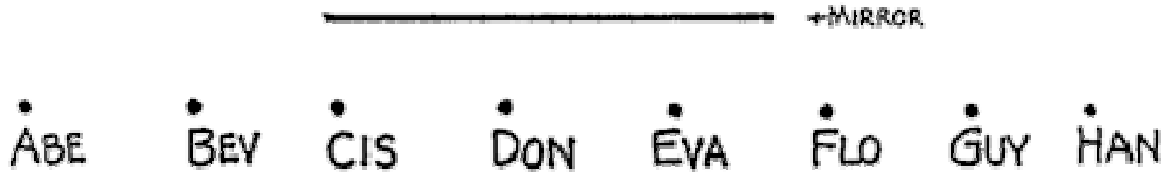
Their positions are shown in the accompanying diagram. Draw a line from the person looking to the closest side of the mirror. Draw the reflected ray using $\theta_i = \theta_r$. Then draw a line from the person looking to the far side of the mirror. Draw the reflected ray using $\theta_i = \theta_r$. Everyone between those two reflected rays can be seen by the person looking.

5. Who can Abe see? (select all that apply)



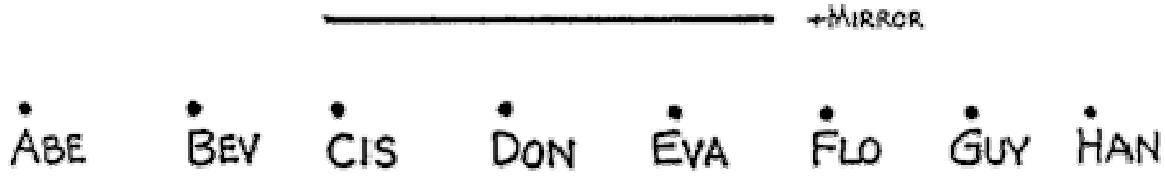
A) Abe B) Bev C) Cis D) Don E) Eva F) Flo G) Guy H) Han

6. Who can Don see? (select all that apply)

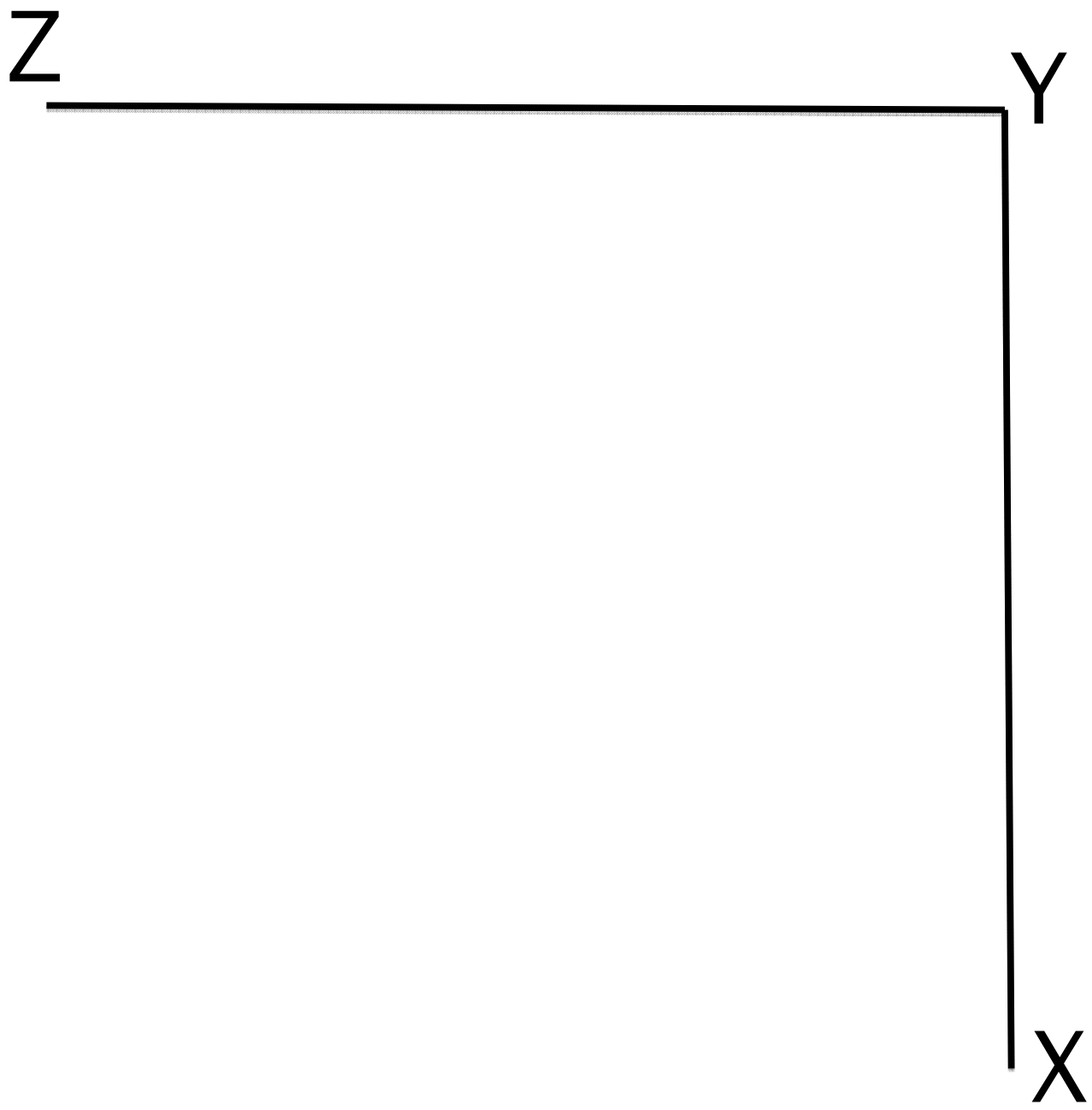


A) Abe B) Bev C) Cis D) Don E) Eva F) Flo G) Guy H) Han

7. Who can Guy see? (select all that apply)



A) Abe B) Bev C) Cis D) Don E) Eva F) Flo G) Guy H) Han


Z
Y
X