Allen Harina
Pd. 4
4/17/15

Ray Optics PHET Lab

Objectives
Understand the movement of rays
Understand the distance of rays
Understand reflection patterns of rays

Equipment:
Computer
Phet lab program

Click to draw the rays using the 3-ray system you learned in class.

Move the object towards the lens. What happens to the image formed on the other side of the lens?

The image of the object gets inverted.

As you move the object inside the lens' focal point something odd happens. Rays that don't meet diverge. Does this mean no image will be formed? an image is created but it is behind the mirror

Click on the ruler. You will need to make several measurements during the lab. You may, if you wish, leave your measurements in cm when using the formulas given above.

Set the lens's refractive index (n) to 1.8 and the radius of curvature (R) to 0.7m. Use the appropriate equation above to solve for the focal distance (f). f = 34 cm
(Measure the focal distance to confirm your answer.)

Using the focal distance you just found, complete the table below and check your work in the simulation.

focal distance (f)	distance object	distance image	magnification (m)
4.8 cm	120 cm	42 m	3 x
	90 cm	38 m	3.5 m
	60 cm	26 m	4 x

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	30 cm	**15 m**	**5.6 x**
	15 cm	**6 m**	**7 x**

1. Images found behind a lens are real / virtual images that will be upright / inverted.

2. As the radius of curvature of the lens increases, the focal point of that lens becomes closer to / further away from that lens.

3. As the refractive index of the lens increases, the focal point of that lens becomes closer to / further away from that lens.

4. What advantage does a larger lens have over a smaller lens (all other characteristics being equal)? a larger lens is able to create an image more larger than a smaller lens.
5. What was the focal distance (f) when the radius of curvature was .70 and index of refraction was 1.8? 27 ms/2

6. Calculate the radius of curvature of a lens with a focal distance of 40. cm and an index of 1.2.

7. An object placed 35cm away from a lens projects a real image .55m behind the lens. What is this lens' focal distance? 4 cm

8. What is the lens' magnification? 2.5 x magnification

9. An object 20. cm to the left of a convex lens is 1.0 m in height. What is the height and location of its image if the lens has a magnification of -2.0? m and 34 cm on the left / right side of the lens 27

10. Imagine you are nearsighted (can only see close objects clearly and far objects are blurry). At your last eye doctor's appointment, your optometrist tells you that she will need to increase your prescription because as it turns out light is focusing "too soon" or in front of your retina. You respond, "Obviously, I will need a converging / diverging lens with a higher / lower focal distance."

Results:

This lab has allowed me to understand and further create an understanding on the

reflection and patterns of waves. This lab didn't have many errors due to the fact that it was virtual and cannot create mistakes due to human factors. It being virtual allows it to be very precise in what it is supposed to be and helps us to understand what the lab is trying to convey. I thought that if it were a real physical lab, I would be more interested rather than a virtual lab.

Conclusion:

The objectives for this lab were well met and I now have an understanding of how light rays work with mirrors. This lab helped me understand diffraction of waves and how the rays have different effects when meeting a different type of mirror. I think this lab was very successful in showing me an understanding of the rays which will help me understand how they work in the real world.