

## PhET Online Lab, Geometric Optics, Part 1

### I. Introduction

In this guided inquiry activity, you will investigate how an image is formed by four different optical instruments: a convex lens, a concave lens, a convex mirror, and a concave mirror. By the end of this lab, you should be able to (1) explain how the characteristics of the image change as the object is brought closer to each of the lenses and mirrors, (2) explain the similarities and differences between the image formation for each of the lenses and mirrors, and (3) explain the meaning of the points  $F$  and  $2F$  for the convex lens and concave mirrors.

You will use one of the simulations from PhET Interactive Simulations. The simulation is called Geometric Optics (GEOPTICS). The link for the simulation is: <https://www.phet.colorado.edu/geometric-optics>.

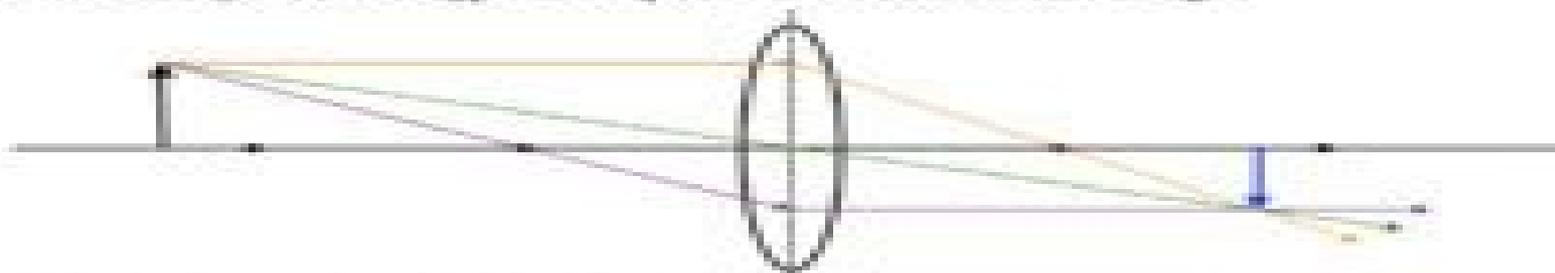
### II. Convex Lens and Concave Mirror

To begin, click on the Lens window. Next, click on the PhET logo in the bottom right hand corner of the simulation and then click Optics. When the Optics window opens, check the red "2F points" box and change the focal length control from infinity to 40 cm. Close the Optics window.



Next, on the simulation window (1) change Rays from Marginal to Principal, (2) make the lens diameter 200 cm and (3) check the 2F Points and Labels boxes. Leave the focal length at 40 cm and the Second Point box unchecked.

Choose an object from the upper left drop down menu. Do not choose the light.



(1) On the diagram above, label the following:

- |                     |   |
|---------------------|---|
| a) the optical axis | e) the focal length   |
| b) the object       | f) the points that are two focal lengths away from the lens |
| c) the image        | g) the object distance                                      |
| d) the focal points | h) the image distance                                       |

(2) Move the object back and forth on the optical axis. Where does the convex lens form an image?

# Geometric Optics Phet Lab Answer Key

**Daniel F McAuley**



## **Geometric Optics Phet Lab Answer Key:**

Teaching about Geometric Optics Jane Bray Nelson, Jim Nelson, 2020      **Geometric Optics** Allen Nussbaum, 1968  
Geometric Optics , 1987      **Problems And Solutions On Optics** Yung-kuo Lim, 1991-02-28 The material for these volumes has been selected from the past twenty years examination questions for graduate students at University of California at Berkeley Columbia University the University of Chicago MIT State University of New York at Buffalo Princeton University and University of Wisconsin      *Problems And Solutions On Optics (Second Edition)* Swee Cheng Lim, Choy Heng Lai, Leong-chuan Kwek, 2019-09-24 This volume is a compilation of carefully selected questions at the PhD qualifying exam level including many actual questions from Columbia University University of Chicago MIT State University of New York at Buffalo Princeton University University of Wisconsin and the University of California at Berkeley over a twenty year period Topics covered in this book include geometrical optics quantum optics and wave optics This latest edition has been updated with more problems and solutions bringing the total to over 200 problems The original problems have been modernized and outdated questions removed placing emphasis on those that rely on calculations The problems range from fundamental to advanced in a wide range of topics on optics easily enhancing the student s knowledge through workable exercises Simple to solve problems play a useful role as a first check of the student s level of knowledge whereas difficult problems will challenge the student s capacity on finding the solutions      **Geometric Optics I.** , 1966      Geometric Optics Darren John Boehm, 1997      Geometric Optics Jeremy Tatum, 2021      **A Geometric Optics Primer** Ellen Stoner, 1996      *Geometric Optics* Louis Claude Martin, 1955      **Non-standard Geometric Optics** Anthony Joseph Seward, 1993      **Geometrical Optics** Herbert D. Peckham, 1972      *Geometrical & Physical Optics* Chakrabarti P, 2010      Teaching About Geometric Optics Jane Bray Nelson, Jim Nelson, 2020 Teaching About Geometric Optics Teacher s Notes guides physics teachers to help students develop a foundational understanding of geometric optics The cornerstone of photonics systems geometric optics have applications in a wide range of industries including technology medical and military sectors This book covers the basics of light propagation reflection and refraction and the use of simple optical elements such as mirrors prisms lenses and optical fibers      **Geometrical Optics** Osmund Airy, 1870      **Laboratory Exercises in Geometrical Optics** Ralph Smith Minor, Harvey Elliott White, 1941      Geometrical Optics Archibald Stanley Percival, 1913      **A Treatise on Geometrical Optics** Robert Samuel Heath, 1887      *A Treatise on Geometrical Optics* ,      **Geometric Optics, Seminar-in-depth** , 1966

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