

Geometric Optics

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

Spoken Tutorial & FOSSEE Team
IIT Bombay

22 October 2024



Learning Objectives



Learning Objectives

We will learn about,



Learning Objectives

We will learn about,

- ▶ **Image formed by a lens and a mirror**



Learning Objectives

We will learn about,

- ▶ Image formed by a lens and a mirror
- ▶ Distance between the lens or mirror and the image



Learning Objectives

We will learn about,

- ▶ Image formed by a lens and a mirror
- ▶ Distance between the lens or mirror and the image
- ▶ Size and nature of the image formed



System Requirement



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▶ **Ubuntu Linux OS v22.04**



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- ▶ **Ubuntu Linux OS v22.04**
- ▶ **Firefox web browser v126.0.1**



Prerequisites



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- ▶ **Learner should be familiar with topics in basic physics**



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- ▶ Learner should be familiar with topics in basic physics
- ▶ Please use the link below to access the tutorials on PhET Simulations
<https://spoken-tutorial.org>



Link for PhET Simulation

- ▶ Please use the given link to download the PhET simulation
<https://phet.colorado.edu/en/simulations/geometric-optics>



Geometric Optics



Geometric Optics

- ▶ **Geometric optics is a branch of optics**



Geometric Optics

- ▶ **Geometric optics is a branch of optics**
- ▶ **It shows propagation of light in the form of rays, which pass through a medium**



PhET Simulations



PhET Simulations

In this tutorial we will use,



PhET Simulations

In this tutorial we will use,

- ▶ **Geometric Optics PhET Simulation**



Image Formation by a Convex lens

Table 1: Image formation by a convex lens

Object Position	Image Position	Image Size	Nature
At $2F_1$	At $2F_2$	Same size as object	Real, inverted
Beyond $2F_1$	Between F_2 and $2F_2$	Diminished	Real, inverted
Between F_1 and $2F_1$	Beyond $2F_2$	Magnified	Real, inverted
At F_1	Infinity	Highly magnified	Real, inverted
Between F_1 and O	On the same side as object	Magnified	Virtual, erect
Infinity	F_2	Point Sized	Real, inverted

Concave lens forms a virtual and erect image on the same side of the lens between F_1 and O . It is always diminished.



Image Formation by a Concave mirror

Table 2 : Image formation by a concave mirror

Object Position	Image Position	Image Size	Nature
At $2F_1$	At $2F_2$	Same size as object	Real, inverted
Between F_1 and O	Behind the mirror	Magnified	Virtual, erect
Beyond $2F_1$	Between F_2 and $2F_2$	Diminished	Real, inverted
Between F_1 and $2F_1$	Beyond $2F_2$	Magnified	Real, inverted
At F_1	Infinity	Highly magnified	Real, inverted
Infinity	At the focus F_2	Point Sized	Real, inverted



Summary

We have learnt about,

- ▶ **Image formed by a lens and a mirror**
- ▶ **Distance between the lens or mirror and the image**
- ▶ **Size and nature of the image**



Assignment

- ▶ Explore the Flat mirror option on your own



About the Spoken Tutorial Project

- ▶ Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project



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Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



Acknowledgements

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Thank you

- ▶ **This tutorial is contributed by FOSSEE and Spoken Tutorial Project, IIT Bombay**
- ▶ **Thank you for joining**

