

Converging Lenses: Object-Image Relationships

Lesson Notes

Learning Outcomes

- How do you describe the images of objects that are produced by a converging lens?
- How does the description vary with object location?

L•O•S•T Art of Image Description

The characteristics of a converging lens image depends upon the object's location. The **L•O•S•T Art of Image Description** is used to describe the characteristics of such images.

Location:

Beyond $2F$, at $2F$, between $2F$ and F , object side of lens

Orientation:

Upright (same as object) or Inverted (flipped)

Size:

Magnified in size, reduced in size, or same size

Type:

Real or Virtual

Object-Image Relations

Ray diagrams show that the characteristics of the image depend on where the object is located.

Object Location: Beyond $2F'$

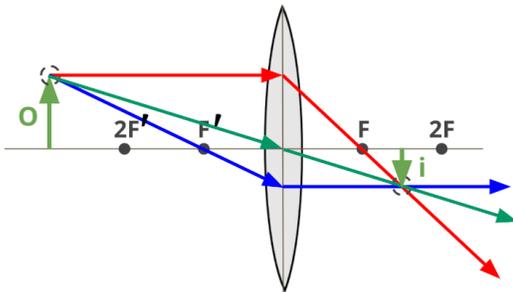


Image Characteristics:

L: Between $2F$ and F **O:** Inverted
S: reduced in size **T:** Real

Object Location: At $2F'$

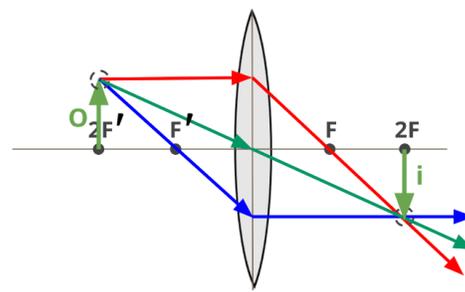


Image Characteristics:

L: At $2F$ **O:** Inverted
S: Same size **T:** Real

Object Loc'n: Between $2F'$ and F'

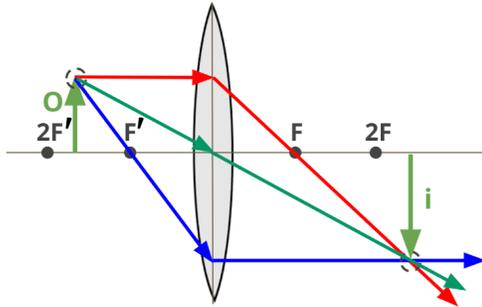


Image Characteristics:

- L:** Beyond $2F$
- S:** Magnified in size
- O:** Inverted
- T:** Real

Object Loc'n: Between F' and Lens

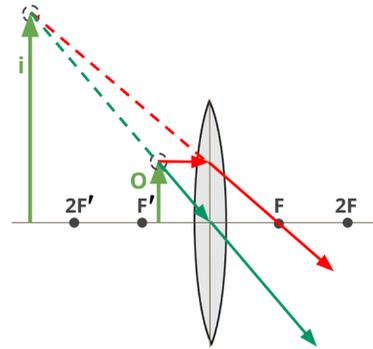
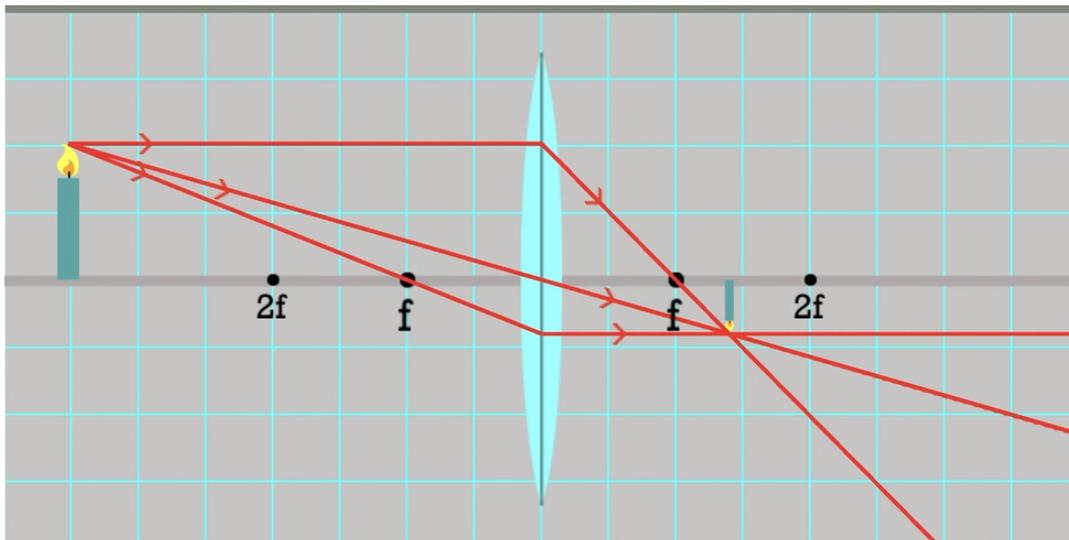


Image Characteristics:

- L:** Object side of lens
- S:** Magnified in size
- O:** Upright
- T:** Virtual

Optics Bench Simulator



Summary

Object Location	Image Orientation	Image Size	Image Type	Image Location
Beyond $2F'$	Inverted	Reduced	Real	Between $2F$ and F
At $2F'$	Inverted	Same size	Real	At $2F$
Between $2F'$ and F'	Inverted	Magnified	Real	Beyond $2F$
Between F' and Lens	Upright	Magnified	Virtual	Object's Side of Lens