

Optics - Thin Lens

Name _____ Date _____

Source Notes:

This lab was modeled after the "Convex Lenses" lab #35
"Laboratory Physics", Murphy Doyle, Merrill, 1990.
ISBN 0-675-02477-3

Jim Haine - Wissahickon High School, Ambler PA.
1997(?)
Modified 2010

Teacher Notes:

Modifications:

Grade

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Classroom Trial

In this activity, you will measure the focal length (f) of a convex lens and place an object at various distances from the lens to observe the location, size, and orientation of the images. Find the focal length of a concave lens by tracing diverging rays backwards to locate the focal point. Recall that real images can be projected onto a screen; virtual images cannot be projected.

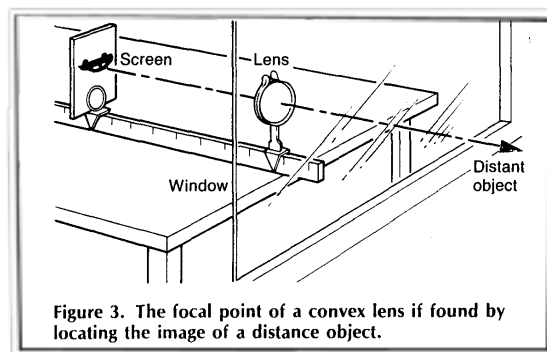


Figure 3. The focal point of a convex lens if found by locating the image of a distance object.

Measured Focal Length _____

Additional Trials

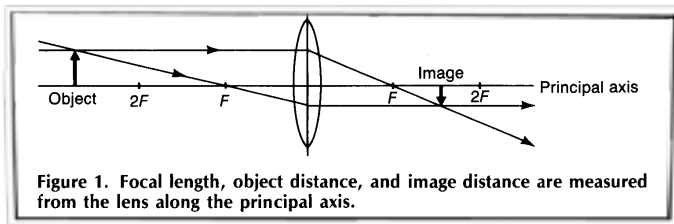
For the 4 remaining trials, place a small candle above the 10 cm mark on the meter stick. The lens position will change for each of the trials, use the first column for the proper placement. The object distance is measured from the lens to the candle. Focus an image of the candle onto the card wherever possible, and note the position of the card. The image distance is the separation between the lens and the card.

<i>Lens Location</i>	D_o	<i>Card Location</i>	D_i	<i>Magnification:</i> <i>larger or smaller</i>	<i>Direction:</i> <i>inverted or upright</i>	<i>Image:</i> <i>real or virtual</i>
class demo	∞					
Lens (60)	50					
Lens (50)	40					
Lens (40)	30					
Lens (20)	10	?				

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Ray Diagrams

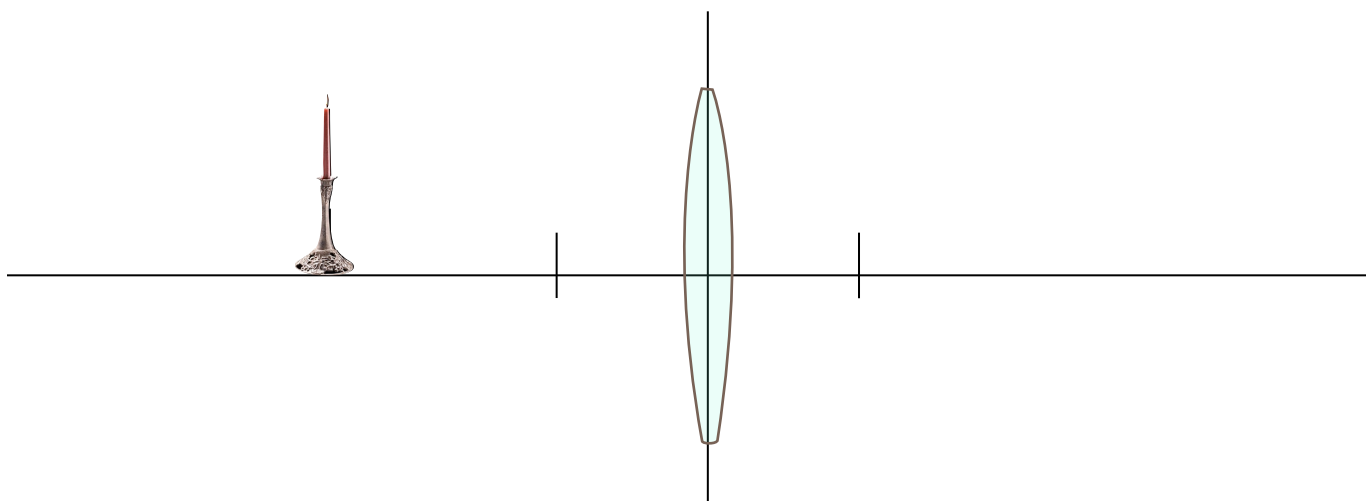


What was your focal length?

Scale: 2cm = _____

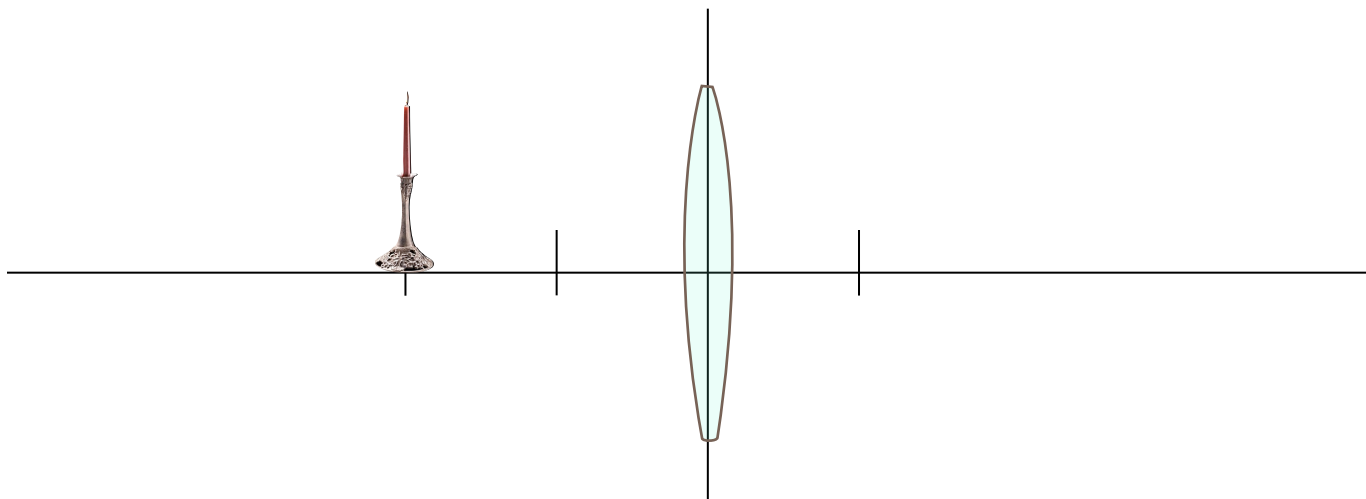
Trial 1:

Summarize the characteristics of images formed by convex lenses when the object is located beyond 2 focal lengths. Draw the ray diagram for your first trial.



Trial 2:

Summarize the characteristics of images formed by convex lenses when the object is located at 2 focal lengths. Draw the ray diagram for your second trial.



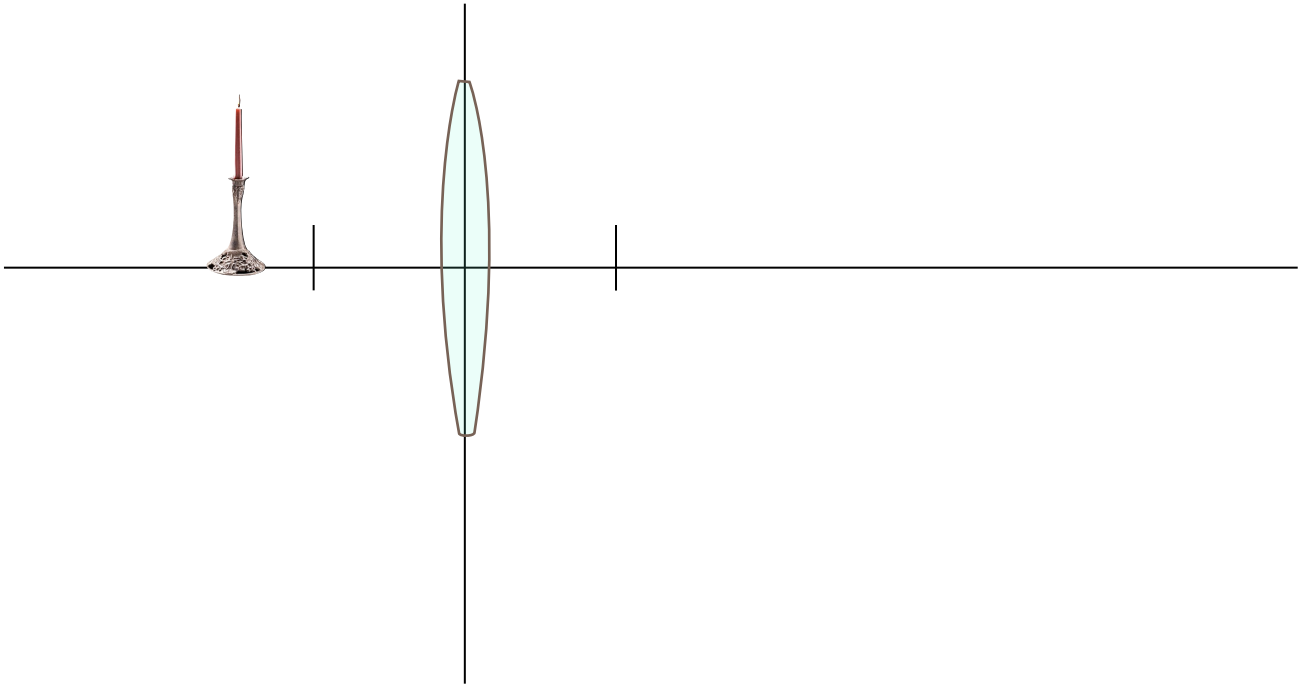
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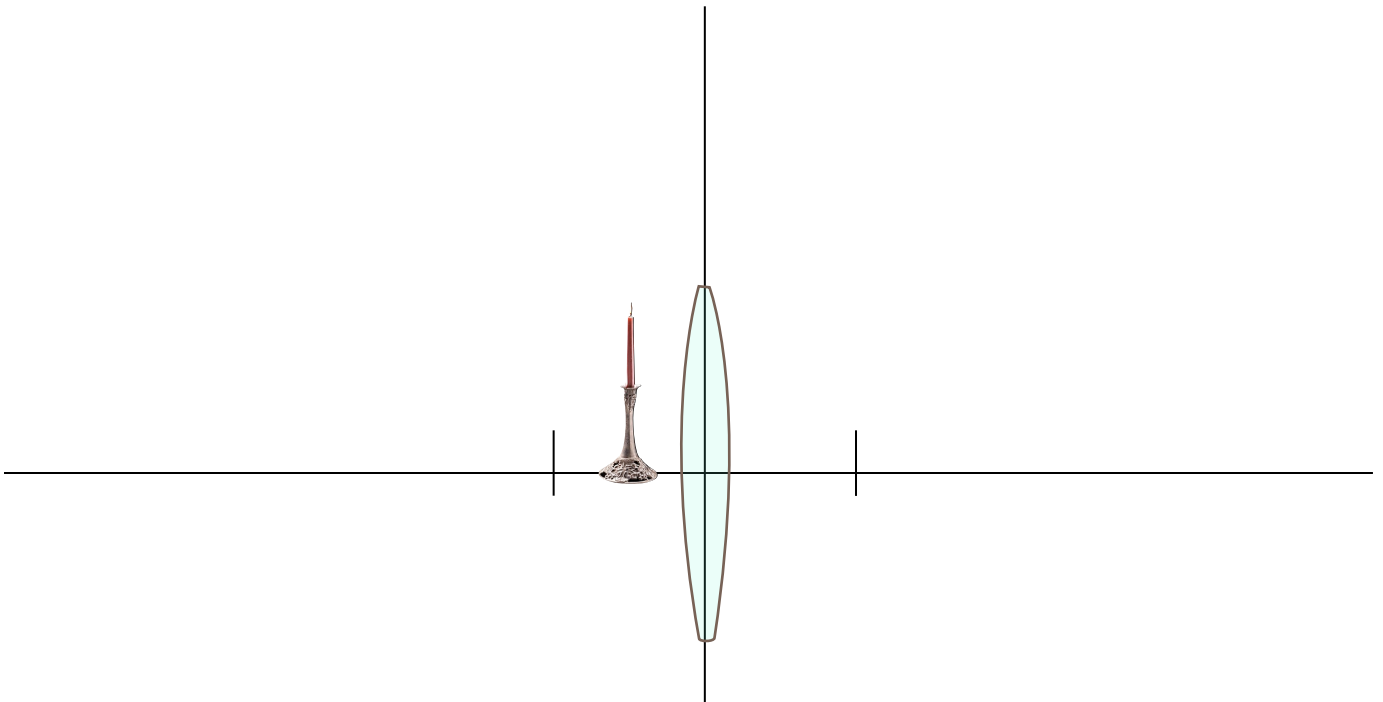
Trial 3:

Summarize the characteristics of images formed by convex lenses when the object is located closer than 2 focal lengths. Draw the ray diagram for your third trial.



Trial 4:

Summarize the characteristics of images formed by convex lenses when the object is located inside one focal length. Draw the ray diagram for your fourth trial.



Grade