Virtual Images

Virtual Image for a Diverging Lens:

You have discovered that **diverging lenses cannot** make real images. Diverging lenses can only create virtual images. These images are **always right-side up and on the same side of the lens** as the object, so you must look **through the lens** to see this type of image. Use the diverging lens (f=-10 cm). Place the object near the lens and adjust the position so that the image (through the lens) appears about ½ the size (**width**) of the object. (Look over the top of the lens to see the object!) Record the distance of the object to the lens.

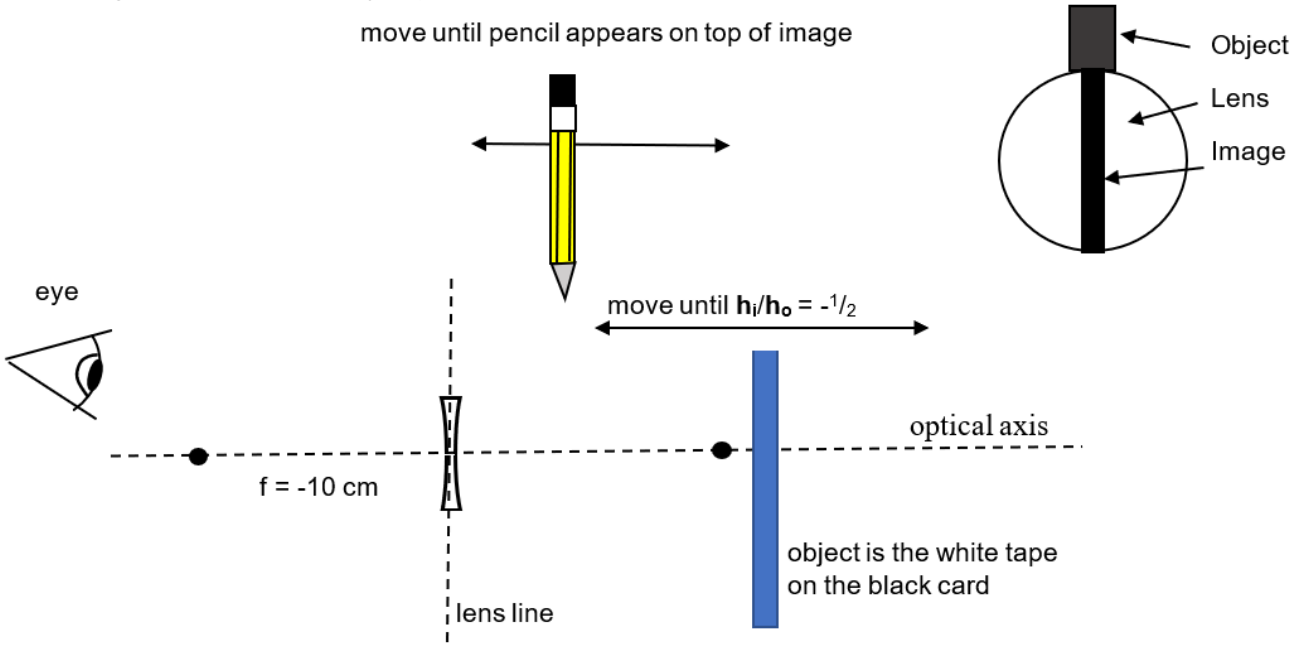
$\mathbf{d_o}$ = _____ cm

Now try to hold a pencil at the correct distance so that it seems to be directly over the image. Move your viewing position left and right and adjust the pencil so that it **stays over the image**.

Have your lab partner record the distance from the lens.

$\mathbf{d_i}$ = _____ cm

(Yes, the image is closer than the object!)



Since the image is ½ the size of the object, and $\frac{h_i}{h_o} = \frac{d_i}{d_o}$ then $\frac{d_i}{d_o}$ should equal -½.

Show the calculation for your values:

Substitute your measured values of $\mathbf{d_o}$ and $\mathbf{d_i}$ into the lens equation to calculate focal length:

Virtual Image for Converging Lenses:

When the object is inside the focal point of a converging lens, the lens is used as a magnifying glass. You will have to look through the lens to see this larger, right-side up image (on the same side of the lens as the object).

Place the object near the lens and adjust the position so that the image (through the lens) appears about 2 times the size (**width**) of the object. (Look over the top of the lens to see the object!)

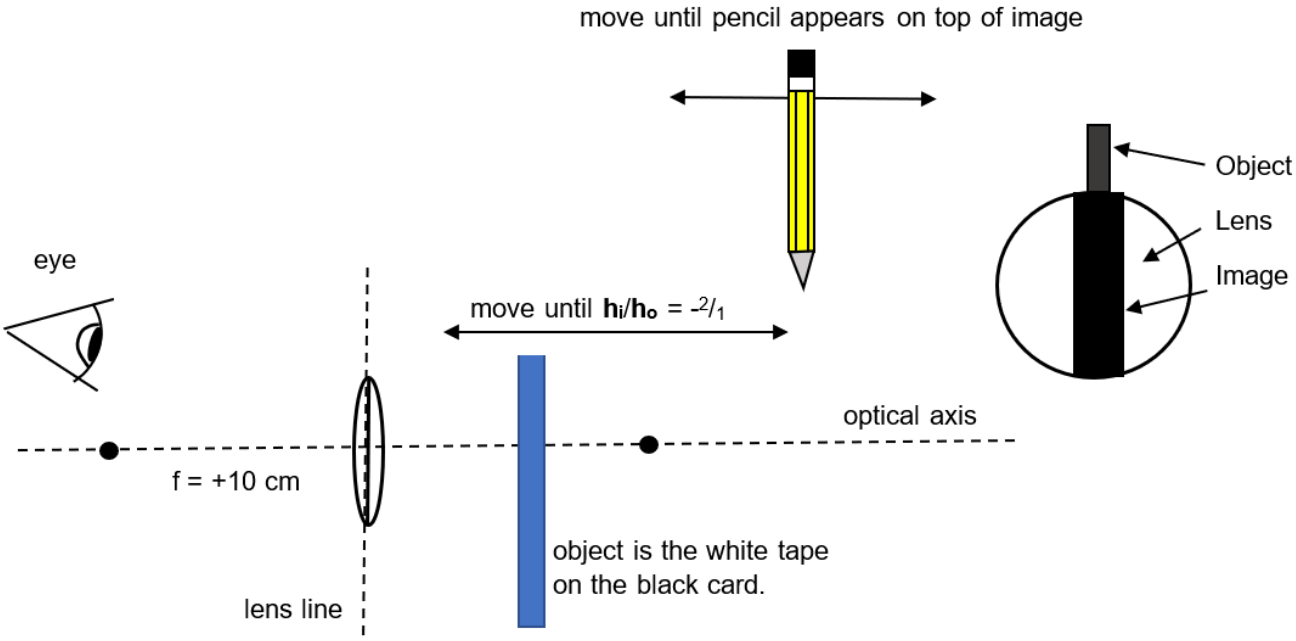
$\mathbf{d_o}$ = _____ cm

Now try to hold a pencil at the correct distance so that it seems to be directly over the image. Move your viewing position left and right and adjust the pencil so that it stays over the image.

Have your lab partner record the distance from the lens.

$\mathbf{d_i}$ = _____ cm

(Yes, the image is farther than the object!)



Since the image is 2 times the size of the object, and $\frac{h_i}{h_o} = \frac{d_i}{d_o}$ then $\frac{d_i}{d_o}$ should equal $-^2/_1$.

Show the calculation for your values:

Substitute your measured values of $\mathbf{d_o}$ and $\mathbf{d_i}$ into the lens equation to calculate focal length: