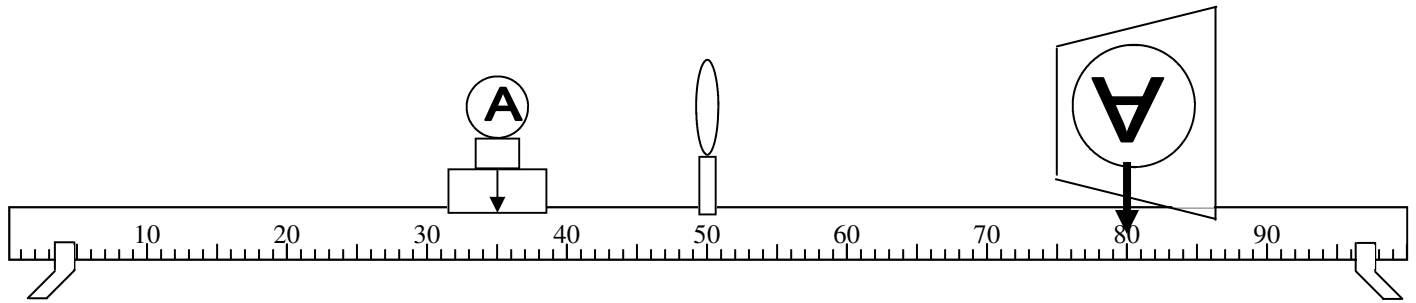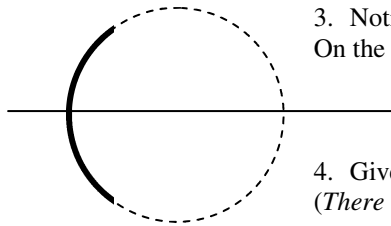# Light 4

1. Since you all did the lab, you should be able to use the above diagram to find the focal length of the lens.
   (*The arrows are there to show you exactly where the devices are located.*)

2. Mark the focal point and radius of curvature on both sides of the lens on the diagram above.

3. Notice the dashed-line circle at the left. Also, notice the mirror cut out of the circle. On the diagram, mark the **radius** of curvature with a C and the focus with an f.

4. Give one quick way to find the focal point of a convex lens without calculating it. (*There are three, actually.*)

5. If the object is on the left side the above mirror would be convergent or divergent?
6. If the object is on the right side the above mirror would be convex or concave?
7. If the object is on the left side the focal length of the above mirror is positive or negative?

Let's practice some of the math.

8. A 3 cm tall object is 5.4 cm from a *convex mirror*. If it has a 4.2 cm focal length….
   A) Since it is a convex mirror, is the focal point positive or negative?
   B) Find the distance to the image.

   C) Is it a real or virtual image?
   D) Find the magnification of the mirror and the height of the image.

Using your notes: "Refraction" to answer the following. I'll explain later. Just do the math.

9. Find the speed of light in ice. (*Be sure to use your "EE" key!*)

10. If light comes hits glass at an incident angle of 40° from air, find the refracted angle in the glass.

Light 4

11. Find the critical angle of light crossing from diamond and air.

For the next part you will need Internet access (at home, my classroom, the library, a friend's house).
From the website go to Physics Links/ Light and Optics Links/ Lens Applet 1. There will be a start button at the bottom (you may have to hit the start button twice).
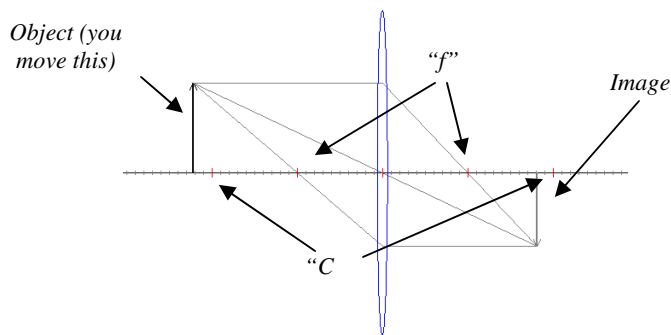
Let me be sure you know how to use the buttons, etc.
This is a picture of the buttons at the top of the page:

o= 22.2   i= 18.1   f= [+] 10.0   M= -0.81   [Lens ∨] [Reset]
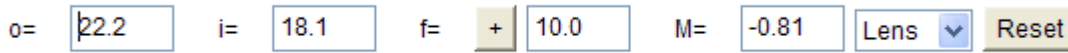
Switches between convergent and divergent.   *Switches between a lens and a mirror.*

Object (you move this)   *"f"*   *Image*

"C

12. Fill in the following tables for each of the four optical devices. (*Just to be sure you know: C>p>f means the object (p) is between C and f.*)

Convex Lens	Location of q	Real or Virtual?	Magnified or reduced?
p = C			
p > C			
C > p > f			
p = f			
p < f			

Concave Lens	Location of q	Real or Virtual?	Magnified or reduced?
p = C			
p > C			
C > p > f			
p = f			
p < f			

Concave Mirror	Location of q	Real or Virtual?	Magnified or reduced?
p = C			
p > C			
C > p > f			
p = f			
p < f			

Convex Mirror	Location of q	Real or Virtual?	Magnified or reduced?
p = C			
p > C			
C > p > f			
p = f			
p < f			